

Matematičke i informacione tehnologije
Математические и информационные технологии
Mathematical and Informational Technologies

MIT 2009

August, 27 - 31, 2009, Kopaonik, Serbia
August, 31 - September, 5, 2009, Budva, Montenegro

Vodič konferencije
Справочник конференции
Conference Information



Univerzitet u Prištini
Prirodno-matematički fakultet
Kosovska Mitrovica

Vodič konferencije

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Математические и информационные технологии
Mathematical and Informational Technologies

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Conference Information

Tehnički urednik: Dragan Aćimović

Izdavač: Prirodno-matematički fakultet
Kosovska Mitrovica
Lole Ribara br. 29
tel: 028/425-396

Za izdavača: Prof. dr Katica Kosanović

Tiraž: 150 primeraka

Organizatori konferencije:

- Institut računarskih tehnologija SO RAN, Novosibirsk, Rusija
- Univerzitet u Prištini, Prirodno-matematički fakultet, Kosovska Mitrovica, Srbija
- Novosibirski državni tehnički univerzitetet, Novosibirsk, Rusija
- Kazahstanski nacionalni univerzitet "Al Farabi", Alma Ata, Kazahstan

Организаторы конференции:

- Институт вычислительных технологий СО РАН, Новосибирск, Россия
- Приштинский университет, Естественно-математический факультет, Косовска Митровица, Сербия
- Новосибирский государственный технический университет, Новосибирск, Россия
- Казахский национальный университет им. аль-Фараби, Алматы, Казахстан

The conference is organized by

- Institute of Computational Technologies, Siberian Branch of the Russian Academy of Sciences, Novosibirsk, Russia
- University of Pristina, Kosovska Mitrovica, Serbia
- Novosibirsk State Technical University, Novosibirsk, Russia
- Al-Farabi Kazakh National University, Almaty, Kazakhstan

Pokrovitelji konferencije:

- Ministarstvo za nauku i tehnološki razvoj Republike Srbije
- Prirodno-matematički fakultet, Kosovska Mitrovica
- Državni Univerzitet u Novom Pazaru
- Univerzitet u Prištini, Kosovska Mitrovica
- Medicinski fakultet, Kosovska Mitrovica
- Prof. dr Hranislav Milošević

Конференция проводится при поддержке:

- Министрства науки и технологического развития Республики Сербия
- Естественно-математического факультета университета Приштины, Косовска Митровица, Сербия
- Государственного университета в Нови Пазаре, Сербия
- Университета Приштины, Косовска Митровица, Сербия
- Медицинский факультет, Косовска Митровица, Сербия
- Профессора Хранислава Милошевича

The Conference is supported by the:

- Ministry of Science and Technological Development of the Republic of Serbia
- Natural-mathematical department, University of Pristina, Kosovska Mitrovica, Serbia
- Novi Pazar State University
- University of Pristina, Kosovska Mitrovica, Serbia
- School of Medicine, Kosovska Mitrovica, Serbia
- Prof. Dr. Hranislav Milosevic

Teme Konferencije:*Računarske tehnologije:*

Računski metodi i računarski algoritmi za modelovanje složenih fizičkih pojava, organizacija paralelnog i distribuiranog računarstva, teorija paralelnih procesa.

Informacione i telekomunikacione tehnologije:

Integracija distribuiranih informacionih resursa, obrada prostorno-raspoređenih podataka, tematski i programski orjentisani informacioni sistemi za geografske podatke i znanja, nove telekomunikacione tehnologije.

Matematičke tehnologije:

Diferencijalne jednačine u prirodnim naukama i tehnici, kompleksna analiza, osnovni i primenjeni zadaci matematičke statistike i teorije verovatnoće.

Направления работы:*Вычислительные технологии:*

Численные методы и вычислительные алгоритмы для моделирования сложных физических явлений; организация параллельных и распределенных вычислений, теория параллельных процессов.

Информационные и телекоммуникационные технологии:

Интеграция распределенных информационных ресурсов, обработка пространственно-распределенных данных; проблемно-ориентированные и предметно-ориентированные базы географических данных и знаний; новые телекоммуникационные технологии.

Математические технологии:

Дифференциальные уравнения в задачах естествознания и техники, комплексный анализ; фундаментальные и прикладные задачи математической статистики и теория вероятности.

Conference Topics:*Computing technologies:*

Numerical methods and computational algorithms for modelling of the complex physical phenomena, parallel and distributed calculations, theory of parallel processes.

Information and telecommunication technologies:

Integration of distributed information resources, processing of spatially distributed data; problem-oriented and subject-oriented information systems for geographical data and knowledge; new telecommunicational technologies.

Mathematical technologies:

Differential equations in problems of natural sciences and engineering; complex analysis; fundamental and applied problems of mathematical statistics and probability theory.

Programski odbor:

Šokin J. I., akademik, Rusija, predsednik

Doličanin Ć., rektor Univerziteta u N. Pazaru, Srbija, kopredsednik

Žumagulov B. T., akademik, Kazahstan, kopredsednik

Jovanović A., prorektor Univerziteta u Prištini, Srbija, kopredsednik

Kosanović K., dekan PMF Univerziteta u Prištini, Srbija, kopredsednik

Milošević H., profesor, Srbija, predsednik Organizacionog odbora

Petković D., profesor, Srbija, naučni sekretar

Čubarov L. B., profesor, Rusija, naučni sekretar

Banjanin M., profesor, Bosna i Hercegovina

Vuković M., profesor, Bosna i Hercegovina

Govedarica V., profesor, Bosna i Hercegovina

Pikula M., profesor, Bosna i Hercegovina

Krener D., profesor, Nemačka

Rozner K., profesor, Nemačka

Reš M., profesor, Nemačka

Šokina N., doktor, Nemačka

Kit E., profesor, Izrael

Sladkević M., doktor, Izrael

Danaev N. T., profesor, Kazahstan

Mansurov Z. A., profesor, Kazahstan

Orunhanov M. K., profesor, Kazahstan

Temirbekov N. M., profesor, Kazahstan

Žajnakov A. Ž., profesor, Kirgistan

Dimitrovski D., profesor, Makedonija

Bičkov I. V., član RAN, Rusija

Jerohin G. N., profesor, Rusija

Moskvičev V. V., profesor, Rusija

Potapov V. P., profesor, Rusija

Ričkov A. D., profesor, Rusija

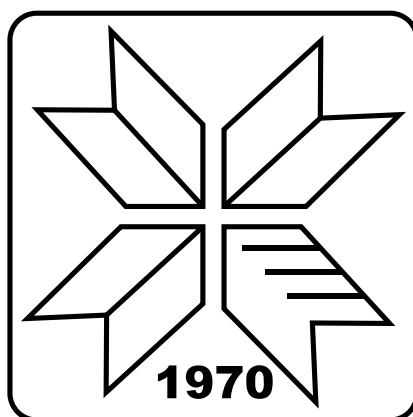
Smagin S. I., član RAN, Rusija

Stempkovskij A. L., akademik, Rusija

Fedotov A. M., član RAN, Rusija

Horoševskij V. G., član RAN, Rusija

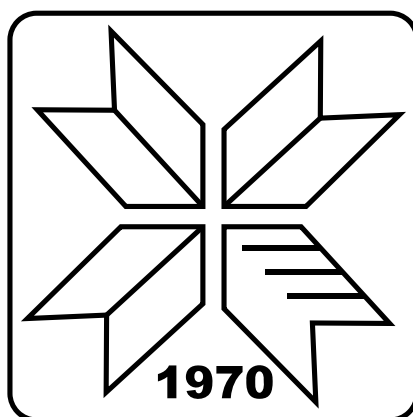
Šajdurov V. V., član RAN, Rusija
Banković B., profesor, Srbija
Gajić L., profesor, Srbija
Doroslovački R., profesor, Srbija
Žorić A., profesor, Srbija
Mijailović Ž., profesor, Srbija
Milovanović G., akademik, Srbija
Milovanović I., profesor, Srbija
Mijailović B., profesor, Srbija
Petrović M., profesor, Srbija
Pilipović S., akademik, Srbija
Protić E., profesor, Srbija
Radenković S., profesor, Srbija
Rakočević V., profesor, Srbija
Rajović M., profesor, Srbija
Cakić N., profesor, Srbija
Kanantaj A., profesor, Tajland
Tahir Beriri Mohamed, profesor, Tunis
Juldašev Z. H., profesor, Uzbekistan
Pavićević Ž., profesor, Crna Gora
Ejnarson B., profesor, Švedska
Radenković B., profesor, Srbija
Samodurov A. A., profesor, Belorusija



Программный комитет:

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Жорич А., профессор, Сербия
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Мияилович Ж., профессор, Сербия
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Милованович И., профессор, Сербия
Петрович М., профессор, Сербия
Пилипович С., академик, Сербия
Протич Е., профессор, Сербия
Раденкович Б., профессор, Сербия
Раденович С., профессор, Сербия
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Раёвич М., профессор, Сербия
Цакич Н., профессор, Сербия
Канантай А., профессор, Таиланд
Тахар Берири Мохамед, профессор, Тунис
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Эйнарсон Б., профессор, Швеция



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Kosanovic K., Professor, Serbia, Co-chairman

Milosevic H. , Professor, Serbia, Chairman of Organizing Committee

Petkovic D., Professor, Serbia, Scientific Secretary

Chubarov L.B., Professor, Russia, Scientific Secretary

Samodurov A.A., Professor, Belarus

Banjanin M., Professor, Bosnia and Herzegovina

Vukovic M., Professor, Bosnia and Herzegovina

Govedarica V., Professor, Bosnia and Herzegovina

Pikula M., Professor, Bosnia and Herzegovina

Kroener D., Professor, Germany

Resch M., Professor, Germany

Roesner K., Professor, Germany

Shokina N.Yu., Doctor, Germany

Kit E., Professor, Israel

Sladkevich M.S., Doctor, Israel

Danaev N.T., Professor, Kazakhstan

Mansurov Z.A., Professor, Kazakhstan

Orunkhanov M.K., Professor, Kazakhstan

Temirbekov N.M., Professor, Kazakhstan

Zhainakov A.Zh., Professor, Kyrgyzstan

Dimitrovski D., Professor, Macedonia

Pavicevic Z., Professor, Montenegro

Bychkov I.V., Corresponding Member of RAS, Russia

Erokhin G.N., Professor, Russia

Fedotov A.M., Corresponding Member of RAS, Russia

Khoroshevskii V.G., Corresponding Member of RAS, Russia

Moskvichev V.V., Professor, Russia

Potapov V.P., Professor, Russia

Rychkov A.D., Professor, Russia

Shaidurov V.V., Corresponding Member of RAS, Russia

Smagin S.I., Corresponding Member of RAS, Russia

Stempkovskii A.L., Academician, Russia

Bankovic B., Professor, Serbia

Cakic N., Professor, Serbia

Doroslovacki R., Professor, Serbia

Gaic L., Professor, Serbia

Mijailovic B., Professor, Serbia

Mijailovic Z., Professor, Serbia

Milovanovic G., Academician, Serbia

Milovanovic I., Professor, Serbia

Petrovic M., Professor, Serbia

Pilipovic S., Academician, Serbia

Protic J., Professor, Serbia

Radenkovic B., Professor, Serbia

Radenovic S., Professor, Serbia

Rajevic M., Professor, Serbia

Rakocevic V., Professor, Serbia

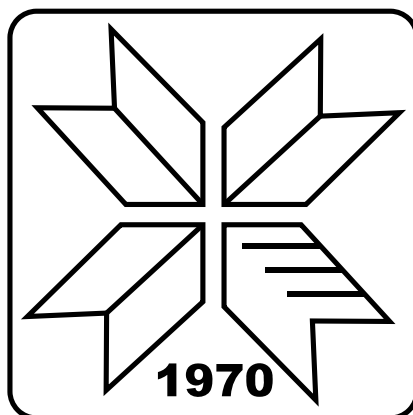
Zoric A., Professor, Serbia

Einarsson B., Professor, Sweden

Kanantai A., Professor, Thailand

Tahar Berriri Mohamed, Professor, Tunis

Yuldashev Z.Kh., Professor, Uzbekistan

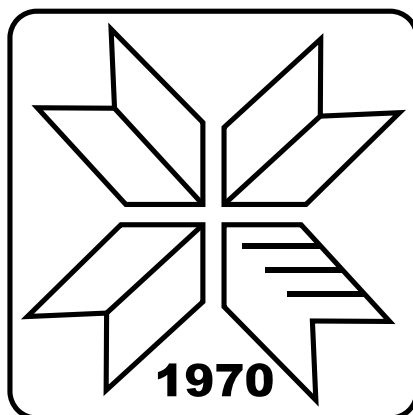


Plan rada konferencije MIT 2009 - Kopaonik

Četvrtak, 27.08.2009.	14:00 - 22:00	Dolazak i registracija učesnika
Petak, 28.08.2009.	08:00	Registracija učesnika
	09:00	Otvaranje konferencije
	09:30	Plenarna sednica
	11:00	Prijem kod Dekana - koktel
	11:30	Plenarna sednica
	13:30	Ručak
	14:30	Rad po sekcijama
	16:30	Kafe pauza
	16:45	Rad po sekcijama
	18:30	Okrugli sto „Matematika i informatika, savremeni tokovi“
	20:30	Večera
Subota, 29.08.2009.	09:00	Plenarna sednica
	11:00	Kafe pauza
	11:15	Plenarna sednica
	13:30	Ručak
	14:30	Rad po sekcijama
	16:30	Kafe pauza
	16:45	Rad po sekcijama
	18:30	Završetak rada po sekcijama
	20:30	Svečana večera - banket (restoran hotela Grand)
nedelja, 30.08.2009.	09:00	Plenarna sednica
	11:00	Kafe pauza
	11:15	Završna plenarna sednica
	13:30	Ručak
	15:00	Izlet žičarom na Pančičev vrh
	20:30	Večera
ponedeljak, 31.08.2009.	09:00	Odlazak učesnika kući
	09:00	Deo učesnika Konferencije, koji nastavljaju sa radom u Budvi, putuje uz obilazak manastira Gradac i Sopoćani.

Plan rada konferencije MIT 2009 - Budva

Utorak,	09:00	Prezentacija postera T1
01.09.2009.	13:30	Ručak
	14:30	Zasedanje radne grupe W2
	16:30	Kafe pauza
	16:45	Zasedanje radne grupe W2
	19:00	Završetak rada
Sreda,	09:00	Prezentacija postera T2
02.09.2009.	13:30	Ručak
	14:30	Zasedanje radne grupe W3
	16:30	Kafe pauza
	16:45	Zasedanje radne grupe W3
	19:00	Završetak rada
Četvrtak,	09:00	Prezentacija postera T3
03.09.2009.	13:30	Ručak
	14:30	Zasedanje radne grupe W4
	16:30	Kafe pauza
	16:45	Zasedanje radne grupe W4
	19:00	Završetak rada
Petak,	09:00	Zasedanje radne grupe W5
04.09.2009.	11:30	Zatvaranje konferencije
	13:30	Ručak

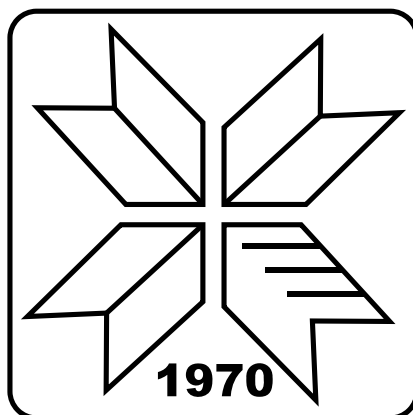


Расписание работы конференции MIT 2009- Копаоник

Четверг, 27.08.2009.	14:00 -	Приезд и регистрация участников
	22:00	
Пятница, 28.08.2009.	08:00	Регистрация участников
	09:00	Открытие конференции
	09:30	Пленарное заседание
	11:00	Перерыв (прием у декана)
	11:30	Пленарное заседание
	13:30	Обед
	14:30	Секционные заседания
	16:30	Перерыв
	16:45	Секционные заседания
	18:30	Круглый стол «Математика и информатика, современные проблемы»
	20:30	Ужин
	Суббота, 29.08.2009.	09:00
11:00		Перерыв
11:15		Пленарное заседание
13:30		Обед
14:30		Секционные заседания
16:30		Перерыв
16:45		Секционные заседания
18:30		Окончание работы
20:30		Торжественный ужин – банкет (ресторан гостиницы Гранд)
Воскресенье, 30.08.2009.	09:00	Пленарное заседание
	11:00	Перерыв
	11:15	Завершающее пленарное заседание
	13:30	Обед
	15:00	Подъем на фуникулере к вершине «Панчи-чев Врх»
	20:30	Ужин
Понедельник, 31.08.2009.	09:00	Отъезд участников, завершивших работу на конференции
	09:00	Отъезд участников, продолжающих работу в Будве, с посещением по дороге монастырей Градац и Сопочаны.

Расписание работы конференции MIT- Будва

Вторник, 01.09.2009.	09:00	Стендовые доклады T1
	13:30	Обед
	14:30	Заседание рабочей группы W2
	16:30	Перерыв
	16:45	Заседание рабочей группы W2
	19:00	Окончание работы
Среда, 02.09.2009.	09:00	Стендовые доклады T2
	13:30	Обед
	14:30	Заседание рабочей группы W3
	16:30	Перерыв
	16:45	Заседание рабочей группы W3
	19:00	Окончание работы
Четверг, 03.09.2009.	09:00	Стендовые доклады T3
	13:30	Обед
	14:30	Заседание рабочей группы W4
	16:30	Перерыв
	16:45	Заседание рабочей группы W4
	19:00	Окончание работы
Пятница, 04.09.2009.	09:00	Заседание рабочей группы W5
	11:30	Закрытие конференции
	13:30	Обед

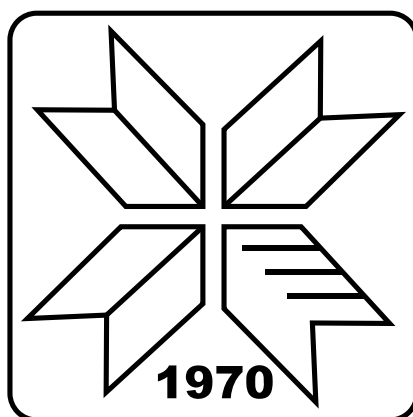


MIT 2009 Timetable - Kopaonik

Thursday, 27.08.2009.	14:00 - 22:00	Arrival and registration of participants
Friday, 28.08.2009.	08:00	Registration of participants
	09:00	Conference opening
	09:30	Plenary session
	11:00	Welcome reception - cocktail
	11:30	Plenary session
	13:30	Lunch
	14:30	Workshops
	16:30	Coffee break
	16:45	Workshops
	18:30	Round table „Mathematical and Information Sciences, contemporary tendencies “
	20:30	Dinner
Saturday, 29.08.2009.	09:00	Plenary session
	11:00	Coffee break
	11:15	Plenary session
	13:30	Lunch
	14:30	Workshops
	16:30	Coffee Break
	16:45	Workshops
	18:30	End of day
	20:30	Banquet (restaurant of hotel Grand))
Sunday, 30.08.2009.	09:00	Plenary session
	11:00	Coffee Break
	11:15	Closing plenary session
	13:30	Lunch
	15:00	Tour to the Pancic's Peak
	20:30	Dinner
Monday, 31.08.2009.	09:00	Departure
	09:00	Participants continue Confererence are travel- ling to Budva, Montenegro, and they will visit monasteries Gradac and Sopocani on their way.

MIT 2009 Timetable - Budva

Tuesday, 01.09.2009.	09:00	Poster session T1
	13:30	Lunch
	14:30	Working group W2
	16:30	Coffee break
	16:45	Working group W2
	19:00	End of day
Wednesday, 02.09.2009.	09:00	Poster session T2
	13:30	Lunch
	14:30	Working group W3
	16:30	Coffee break
	16:45	Working group W3
	19:00	End of day
Thursday, 03.09.2009.	09:00	Poster session T3
	13:30	Lunch
	14:30	Working group W4
	16:30	Coffee break
	16:45	Working group W4
	19:00	End of day
Friday, 04.09.2009.	09:00	Working group W5
	11:30	Conference closing
	13:30	Lunch



RADNE GRUPE

W1 – Radna grupa (okrugli sto)

“Matematika i informatika, savremeni tokovi”

Profesor Jurij Jakovlevič Belov
Profesor Dojčin Petković
Profesor Miloje Rajović
Profesor Vladica Stojanović
Profesor Stana Cvejić
Profesor Vladimir Viktorovič Šajdurov

W2 – Radna grupa (okrugli sto)

“Problemi savremenog matematičkog obrazovanja”

Profesor Jurij Ivanovič Šokin
Profesor Jurij Jakovlevič Belov
Profesor Hranislav Milošević
Profesor Mihail Petrovič Fedoruk
Profesor Vladimir Viktorovič Šajdurov

W3 – Radna grupa (okrugli sto) “Matematičko modeliranje”

Profesor Vladimir Viktorovič Šajdurov
Profesor Sergej Kuzmič Goluško
Profesor Eliezer Kit
Profesor Hranislav Milošević
Profesor Vladimir Viktorovič Moskvicev
Profesor Aleksandar Dimitrijevič Ričkov
Profesor Mihail Petrovič Fedoruk

W4 – Radna grupa (okrugli sto)

“Informacione tehnologije”

Profesor Jurij Ivanovič Šokin
Profesor Konstantin Jevgenjevič Afanasjev
Profesor Igor Vjačeslavovič Bičkov
Profesor Dojčin Petković
Profesor Vadim Petrovič Potapov
Profesor Anatolij Mihajlovič Fedotov

W5 – Radna grupa (okrugli sto)

“Sistemi monitoringa životne sredine”

Profesor Jurij Ivanovič Šokin
Profesor Igor Vjačeslavovič Bičkov
Doktor Nikolaj Nikolajevič Dobrecov
Profesor Vadim Petrovič Potapov
Profesor Dragan Radovanović
Profesor Leonid Borisovič Čubarov

РАБОЧИЕ ГРУППЫ

W1 – Рабочая группа (круглый стол)

«Математика и информатика; современные проблемы»

Профессор Юрий Яковлевич Белов
Профессор Дойчин Петкович
Профессор Милое Раевич
Профессор Владица Стоянович
Профессор Стана Цвейич
Профессор Владимир Викторович Шайдуров

W2 – Рабочая группа (круглый стол)

«Проблемы современного математического образования»

Профессор Юрий Иванович Шокин
Профессор Юрий Яковлевич Белов
Профессор Хранислав Милошевич
Профессор Михаил Петрович Федорук
Профессор Владимир Викторович Шайдуров

W3 – Рабочая группа (круглый стол) «Математическое моделирование»

Профессор Владимир Викторович Шайдуров
Профессор Сергей Кузьмич Голушко
Профессор Элиезер Кит
Профессор Хранислав Милошевич
Профессор Владимир Викторович Москвичев
Профессор Александр Дмитриевич Рычков
Профессор Михаил Петрович Федорук

W4 – Рабочая группа (круглый стол)

«Информационные технологии»

Профессор Юрий Иванович Шокин
Профессор Константин Евгеньевич Афанасьев
Профессор Игорь Вячеславович Бычков
Профессор Дойчин Петкович
Профессор Вадим Петрович Потапов
Профессор Анатолий Михайлович Федотов

W5 – Рабочая группа (круглый стол)

«Системы мониторинга окружающей среды»

Профессор Юрий Иванович Шокин
Профессор Игорь Вячеславович Бычков
Доктор Николай Николаевич Добрецов
Профессор Вадим Петрович Потапов
Профессор Драган Радованович
Профессор Леонид Борисович Чубаров

WORKING GROUPS

W1 – Work group (round table)

“Mathematical and Information Sciences, contemporary tendencies”

Professor Yuriy Yakovlevich Belov
Professor Dojcin Petkovic
Professor Miloje Rajovic
Professor Vladica Stojanovic
Professor Stana Cvejic
Professor Vladimir Victorovich Shaidurov

W2 – Work group (round table)

“The problems of contemporary mathematical education”

Professor Yuri Ivanovitch Shokin
Professor Yuriy Yakovlevich Belov
Professor Hranislav Milosevic
Professor Michail Petrovich Fedoruk
Professor Vladimir Victorovich Shaidurov

W3 – Work group (round table) “Mathematical modeling”

Professor Vladimir Victorovich Shaidurov
Professor Sergey Kuzmich Golushko
Professor Eliezer Kit
Professor Hranislav Milosevic
Professor Vladimir Victorovich Moskvichev
Professor Alexander Dmitrievich Rychkov
Professor Michail Petrovich Fedoruk

W4 – Work group (round table)

“Information Technology”

Professor Yuri Ivanovitch Shokin
Professor Konstantin Evgenievich Afanasiev
Professor Igor Vyacheslavovich Bychkov
Professor Dojcin Petkovic
Professor Vadim Petrovich Potapov
Professor Anatoilii Michailovich Fedotov

W5 – Work group (round table)

“Environmental monitoring systems ”

Professor Yuri Ivanovitch Shokin
Professor Igor Vyacheslavovich Bychkov
Doctor Nikolay Nikolayevich Dobretsov
Professor Vadim Petrovich Potapov
Professor Dragan Radovanovic
Professor Leonid Borisovich Chubarov

		Kopaonik, Srbija				Budva, Crna Gora				
Dan	1	2	3	4	5	6	7	8	9	10
Dan	27 avgust (četvrtak)	28 avgust (petak)	29 avgust (subota)	30 avgust (nedelja)	31 avgust (ponedeljak)	1 septembar (utorak)	2 septembar (sreda)	3 septembar (četvrtak)	4 septembar (petak)	5 septembar (subota)
Vreme	Dolazak na Kopaonik		Dolazak u Budvu		Dolazak sa Kopaonika		Dolazak manastira Gradac i Sopotani		Odlazak iz Budve	
08:00	Registracija		Zlet žičarom na Pančičev vrh		Obilazak manastira Gradac i Sopotani		Obilazak manastira Gradac i Sopotani		Zasedanje radne grupe W5	
09:00	Otvaranje		Večera		Plenarna sednica P5		Plenarna sednica P6		Zatvaranje konferencije	
09:30	Plenarna sednica P1		Večera		Plenarna sednica P3		Plenarna sednica P4		Prezentacija radova T1	
11:00	Prijem kod Dekana		Večera		Kafe pauza		Kafe pauza		Prezentacija radova T2	
11:15	Plenarna sednica P2		Večera		Plenarna sednica P4		Plenarna sednica P5		Prezentacija radova T3	
11:30	Plenarna sednica P2		Večera		Plenarna sednica P4		Plenarna sednica P5		Prezentacija radova T4	
13:30	Ručak		Večera		Ručak		Ručak		Zasedanje radne grupe W2	
14:30	Registracija na Kopaoniku		Večera		Sekcija S1		Sekcija S2		Zasedanje radne grupe W3	
16:30	Kafe pauza		Večera		Sekcija S3		Sekcija S4		Kafe pauza	
16:45	Kafe pauza		Večera		Sekcija S5		Sekcija S6		Zasedanje radne grupe W4	
18:30	Zasedanje radne grupe W1		Večera		Sekcija S1		Sekcija S2		Zasedanje radne grupe W2	
19:00	Završetak rada po sekcijama		Večera		Sekcija S1		Sekcija S2		Zasedanje radne grupe W3	
20:30	Svečana večera (banket)		Večera		Sekcija S1		Sekcija S2		Zasedanje radne grupe W4	

		Будва, Черногория				Копачник, Сербия										Отъезд из Будвы															
День	День	1	2	3	4	5	6	7	8	9	10																				
День	День	27 августа (четверг)	28 августа (пятница)	29 августа (суббота)	30 августа (воскресенье)	31 августа (понедельник)	1 сентября (вторник)	2 сентября (среда)	3 сентября (четверг)	4 сентября (пятница)	5 сентября (суббота)																				
время	время	Засед в Копачник										Поезд из в Будву																			
8-00	8-00	Регистрация		Пленарное заседание Р3		Пленарное заседание Р5		Экскурсия в монастыри Градц и Сопочаны		Стеновые доклады Т1		Стеновые доклады Т2		Стеновые доклады Т3		Заседание рабочей группы W5															
9-00	9-00	Открытие		Пленарное заседание Р4		Пленарное заседание Р6		Отъезд из Копачника		Стеновые доклады Т1		Стеновые доклады Т2		Стеновые доклады Т3		Заседание рабочей группы W5															
9-30	9-30	Пленарное заседание Р1		Пленарное заседание Р4		Пленарное заседание Р6		Отъезд из Копачника		Стеновые доклады Т1		Стеновые доклады Т2		Стеновые доклады Т3		Заседание рабочей группы W5															
11-00	11-00	Прием у декана		Пленарное заседание Р4		Пленарное заседание Р6		Отъезд из Копачника		Стеновые доклады Т1		Стеновые доклады Т2		Стеновые доклады Т3		Заседание рабочей группы W5															
11-15	11-15	Пленарное заседание Р2		Пленарное заседание Р4		Пленарное заседание Р6		Отъезд из Копачника		Стеновые доклады Т1		Стеновые доклады Т2		Стеновые доклады Т3		Заседание рабочей группы W5															
11-30	11-30	Пленарное заседание Р2		Пленарное заседание Р4		Пленарное заседание Р6		Отъезд из Копачника		Стеновые доклады Т1		Стеновые доклады Т2		Стеновые доклады Т3		Заседание рабочей группы W5															
13-30	13-30	Пленарное заседание Р2		Пленарное заседание Р4		Пленарное заседание Р6		Отъезд из Копачника		Стеновые доклады Т1		Стеновые доклады Т2		Стеновые доклады Т3		Заседание рабочей группы W5															
14-30	14-30	Секция S1		Секция S2		Секция S3		Секция S4		Секция S5		Секция S1		Секция S2		Секция S3		Секция S4		Секция S5											
16-30	16-30	Секция S1		Секция S2		Секция S3		Секция S4		Секция S5		Секция S1		Секция S2		Секция S3		Секция S4		Секция S5											
16-45	16-45	Секция S1		Секция S2		Секция S3		Секция S4		Секция S5		Секция S1		Секция S2		Секция S3		Секция S4		Секция S5											
18-30	18-30	Секция S1		Секция S2		Секция S3		Секция S4		Секция S5		Секция S1		Секция S2		Секция S3		Секция S4		Секция S5											
19-00	19-00	Секция S1		Секция S2		Секция S3		Секция S4		Секция S5		Секция S1		Секция S2		Секция S3		Секция S4		Секция S5											
20-30	20-30	Секция S1		Секция S2		Секция S3		Секция S4		Секция S5		Секция S1		Секция S2		Секция S3		Секция S4		Секция S5											
		Заседание рабочей группы W1		Окончание работы		Окончание работы		Окончание работы		Окончание работы		Окончание работы		Окончание работы		Окончание работы		Окончание работы		Окончание работы											
		Ужин		Торжественный ужин		Ужин		Ужин		Ужин		Ужин		Ужин		Ужин		Ужин		Ужин											
		Ужин		Торжественный ужин		Ужин		Ужин		Ужин		Ужин		Ужин		Ужин		Ужин		Ужин											
		Ужин		Торжественный ужин		Ужин		Ужин		Ужин		Ужин		Ужин		Ужин		Ужин		Ужин											
		Ужин		Торжественный ужин		Ужин		Ужин		Ужин		Ужин		Ужин		Ужин		Ужин		Ужин											
		Ужин		Торжественный ужин		Ужин		Ужин		Ужин		Ужин		Ужин		Ужин		Ужин		Ужин											
		Ужин		Торжественный ужин		Ужин		Ужин		Ужин		Ужин		Ужин		Ужин		Ужин		Ужин											
		Ужин		Торжественный ужин		Ужин		Ужин		Ужин		Ужин		Ужин		Ужин		Ужин		Ужин											

		Budva, Montenegro				Kopaonik, Serbia				Budva, Montenegro						
Day	Day	1	2	3	4	5	6	7	8	9	10	Day	Day	10 th September (Saturday)		
	27 August (Thursday)	28 August (Friday)	29 August (Saturday)	30 August (Sunday)	31 August (Monday)	1 September (Tuesday)	2 September (Wednesday)	3 September (Thursday)	4 September (Friday)	5 September (Saturday)						
	Arrival of participants				Departure				Visit monasteries Gradac and Sopocani				Departure			
08:00	Registration				Plenary session P5				Plenary session P6				Working group W5			
09:00	Conference opening				Plenary session P3				Coffee break				Poster session T3			
09:30	Plenary session P1				Plenary session P4				Plenary session P2				Poster session T2			
11:00	Welcome reception				Coffee break				Plenary session P2				Poster session T1			
11:15	Plenary session P2				Plenary session P4				Plenary session P2				Poster session T1			
11:30	Plenary session P2				Plenary session P4				Plenary session P2				Poster session T1			
13:30	Lunch				Lunch				Lunch				Lunch			
14:30	Registration of participants				Tour to the Pancic's Peak				Arriving Budva				Working group W2			
16:30	Coffee break				Coffee break				Coffee break				Coffee break			
16:45	Workshop S1				Workshop S1				Workshop S1				Working group W2			
	Workshop S2				Workshop S2				Workshop S2				Working group W3			
	Workshop S3				Workshop S3				Workshop S3				Working group W3			
	Workshop S4				Workshop S4				Workshop S4				Working group W4			
	Workshop S5				Workshop S5				Workshop S5				Working group W4			
18:30	Working group W1				Ending workshops work				Ending work				Ending work			
19:00	Dinner				Banquet				Dinner				Dinner			
20:30	Dinner				Banquet				Dinner				Dinner			

Raspored aktivnosti po objektima

1. Registracija učesnika smeštenih u objektima "Sunčani vrhovi" na recepciji hotela "Sunčani vrhovi",
- četvrtak 27.08.2009. od 14:00 do 22:00 sata
- petak, 28.08.2009. od 08:00 do 12:00 sati
2. Registracija učesnika smeštenih u hotelu "Grand" na recepciji hotela "Grand", -četvrtak 27.08.2009. od 14:00 do 22:00 sata
3. Ceremonija otvaranja - sala "Holidej", hotel "Sunčani vrhovi"
4. Sva plenarna zasedanja - sala "Holidej", hotel "Sunčani vrhovi"
5. Zasedanje sekcije S1 - sala "Holidej", hotel "Sunčani vrhovi"
6. Zasedanje sekcije S2 - sala "Malo jezero", hotel "Sunčani vrhovi"
7. Zasedanje sekcije S3 - sala "Prezident", hotel "Sunčani vrhovi"
8. Zasedanje sekcije S4 - sala "Prezident", hotel "Sunčani vrhovi"
9. Zasedanje sekcije S5 - sala "Prezident", hotel "Sunčani vrhovi"
10. Zasedanje Radne grupe W1 - sala "Prezident", hotel "Sunčani vrhovi"

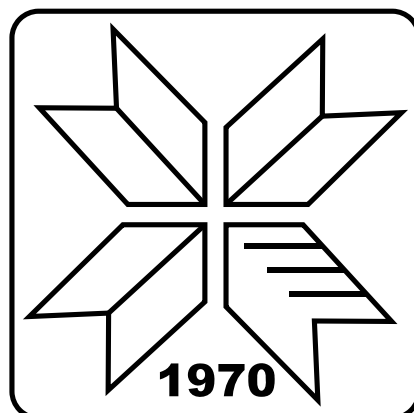
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Места проведения мероприятий Конференции

1. Регистрация участников, проживающих в гостинице "Сунчани Врхови" – холл гостиницы "Сунчани Врхови",
- четверг 27.08.2009: с 14:00 до 22:00,
- пятница, 28.08.2009: с 08:00 до 12:00.
2. Регистрация участников, проживающих в гостинице "Гранд" – холл гостиницы "Гранд"
- четверг 27.08.2009. С 14:00 до 22:00,
3. Церемония открытия - зал "Холидей" гостиницы "Сунчани Врхови"
4. Все пленарные заседания - зал "Холидей" гостиницы "Сунчани Врхови"
5. Заседание секции S1 - зал "Холидей" гостиницы "Сунчани Врхови"
6. Заседание секции S2 - зал "Мало езеро" гостиницы "Сунчани Врхови"
7. Заседание секции S3 - зал "Президент" гостиницы "Сунчани Врхови"
8. Заседание секции S4 - зал "Президент" гостиницы "Сунчани Врхови"
9. Заседание секции S5 - зал "Президент" гостиницы "Сунчани Врхови"
10. Заседание Круглого стола W1 - зал "Президент" гостиницы "Сунчани Врхови"

Venues

1. Registration of participants, who are living in the hotel "Suncani vrhovi", at the lobby of the hotel "Suncani vrhovi",
 - Thursday 27.08.2009: since 02:00 PM till 10:00 PM
 - Friday 28.08.2009: since 08:00 AM till 12:00 AM
2. Registration of participants, who are living in the hotel "Grand", at the lobby of the hotel "Grand",
 - Thursday 27.08.2009. since 02:00 PM till 10:00 PM
3. Conference opening - room "Holidej", hotel "Suncani vrhovi"
4. All plenary seccions - room "Holidej", hotel "Suncani vrhovi"
5. Workshop S1 - room "Holidej", hotel "Suncani vrhovi"
6. Workshop S2 - room "Malo jezero", hotel "Suncani vrhovi"
7. Workshop S3 - room "Prezident", hotel "Suncani vrhovi"
8. Workshop S4 - room "Prezident", hotel "Suncani vrhovi"
9. Workshop S5 - room "Prezident", hotel "Suncani vrhovi"
10. Working group W1 - room "Prezident", hotel "Suncani vrhovi"



ПЛЕНАРНЫЕ ДОКЛАДЫ зал "Холидей" гостиницы "Сунчани Врхови"			
Август, 28 (день второй)			
	Страна	Авторы	Докадчик
			Доклад
9:30	Председатели: Hranislav Milosevic, Юрий Иванович Шокин		
	Сербия	Milovanovic G.	Milovanovic Gradimir
	Россия	Гурарий М.М., Русаков С.Г., Стемпковский А.Л., Ульянов С.Л., Жаров М.М.	Русаков Сергей Григорьевич
			Numerical treatment of Fredholm integral equations Вычислительные аспекты адаптивного метода гармонического баланса в схемотехническом моделировании
11:00	перерыв		
11:30	Председатели: Gradimir Milovanovic, Сергей Григорьевич Русаков		
	Россия	Бычков И.В.	Бычков Игорь Вячеславович
	Россия	Голушко С.К., Голушко К.С.	Голушко Сергей Кузьмич
	Россия	Захаров Ю.Н., Зеленский Е.Е., Потапов В.П., Счастливцев Е.Л., Толстых М.А.	Захаров Юрий Николаевич
13:30	Обед		

Август, 29 (день третий)			
Председатели: Mijajlović Žarko, Владимир Викторович Шайдуров			
Сербия	Mijajlović Ž.	Mijajlović Žarko	Application of information science in digitization of scientific and cultural heritage
Россия	Шайдуров В.В., Карпова Е.Д.	Шайдуров Владимир Викторович	Математические аспекты параллельных реализаций МКЭ для краевой задачи для уравнений мелкой воды
Россия	Белопицкий В.М., Белопицкий П.В., Генова С.Н., Дегерменджи А.Г., Рогозин Д.Ю.	Белопицкий Виктор Михайлович	Одномерная модель вертикальной структуры соленого озера
11:00 перерыв			
11:15 Председатели: Eliezer Kit, Игорь Вячеславович Бычков			
Израиль	Beisel S., Chubarov L., Kit E., Levin A., Shokin Yu., Sladkevich M.	Kit Eliezer	Анализ возможных волн цунами у Израильского берега Средиземного моря
Россия	Смагин С.И.	Смагин Сергей Иванович	О численных методах решения задач дифракции в интегральных постановках
Россия	Фионов А.Н., Рябко Б.Я.	Фионов Андрей Николаевич	Теоретико-информационные методы решения задач стеганографии
Кыргызстан	Жайнаков А.Ж.	Жайнаков Аманбек Жайнакович	Численный расчет электрической дуги методом установления
13:30 Обед			

Август, 30 (день четвертый)			
Председатели: Vožidar Radenković, Анатолий Михайлович Федотов			
Россия	Федотов А.М.	Федотов Анатолий Михайлович	Проблемы интеграции информационных ресурсов
Россия	Белов Ю.Я., Фроленков И.В.	Белов Юрий Яковлевич	Некоторые задачи идентификации коэффициентов параболических уравнений
Россия	Москвичев В.В.	Москвичев Владимир Викторович	Прикладные задачи вероятностного риск-анализа технических систем
11:00 перерыв			
11:15 Председатели: Dojčin Retković, Юрий Яковлевич Белов			
Сербия	Radenković B.	Radenković Vožidar	Information technologies and religion
Сербия	Vanjanin M., Miladinović D.	Milorad Vanjanin	Ontology Concepts of Multiagent Systems
Россия	Афанасьев К.Е., Рейн Т.С., Карабцев С.Н.	Афанасьев Константин Евгеньевич	Численное моделирование задач гидродинамики со свободными границами методом естественных соседей
Россия, Сербия	Рычков А.Д., Шокин Ю.И., Милошевич Х.	Милошевич Хранислав	Применение импульсной аэрозольной системы пожаротушения для борьбы с пожарами в угольных шахтах
13:30 Обед			

СЕКЦИОННЫЕ ДОКЛАДЫ			
	Страна	Авторы	Докадчик
Доклад			
Август, 28 (день второй)			
Секция 1	зал "Холидей" гостиницы "Сунчани Врхови"		
14:30	Председатели: Рајовић Милоје, Александар Леонидович Казаков		
Сербия	Svejic S., Lekic M., Dimitrovski D.	Svejic Stana	Properties of coefficients of analytical periodic functions
Россия	Лемперт А.А., Горнов А.Ю.	Лемперт Анна Ананьевна	Алгоритм стохастической аппроксимации множества достижимости управляемой системы на плоскости
Сербия	Petrovic I., Stefanovic S., Sekulovic N., Petrovic M., Stefanovic M.	Petrovic Ivana	Second order statistics of ratio of two random variables
Сербия	Petrovic I., Petrovic M., Spalevic P.	Petrovic Ivana	Second order statistics of SC diversity system in the presence of fading
Сербия	Petkovic D., Arandjelovic I.	Petkovic Dojcin	On the convergence of diagonal approximation
Сербия	Milovanovic G., Spalevic M., Paunovic L.	Paunovic Ljiljana	Error bounds of Gauss-Turan-Kronrod quadratures with Gori-Micchelli weight functions for analytic functions
Греция	Leontitsis A., Lekkas E., Pange J.	Pange Jenny	A simulation approach on Cronbach's alpha statistical significance
16:30	перерыв		

Август, 28 (день второй)	
Секция 1	зал "Холидей" гостиницы "Сунчани Врхови"
16:45	Председатели: Nikolai Vasilievich Chemetov, Сергей Иванович Смагин
Сербия	Rajkovic P.M., Marinkovic S.D. Stankovic M.S. Rajkovic Predrag
Сербия	Kevkić T.S., Petković D.M. Kevkić Tijana S.
Сербия	Vujaković J., Rajović M. Vujaković Jelena
Сербия, Македония	Dimitrovski D., Vujakovic J., Rajovic M. Vujakovic Jelena
18:30	Завершение работы
Август, 28 (день второй)	
Секция 2	зал "Мало езеро" гостиницы "Сунчани Врхови"
14:30	Председатели: Michael Sladkevich, Василий Васильевич Максимов
Израиль	Sladkevich M. Sladkevich Michael
Россия	Бейзель С.А., Худякова В.К., Чубаров Л.Б., Шокин Ю.И. Чубаров Леонид Борисович
	Numerical Simulations of Long Waves Processes at Coastal Zone Using Shallow Water Model. In Memory of Dr. A.N. Militeev (1943-2003) Моделирование оползневой генерации волн цунами у Средиземноморского побережья Израиля

Россия	Каропова Е.Д., Малышев А.В., Шайдуров В.В.	Каропова Евгения Дмитриевна	Исследование эффективности параллельных реализаций МКЭ для краевой задачи для уравнений мелкой воды
Россия	Старченко А. В., Трунов А. А., Турчановский И. Ю., Шкляев В.А.	Старченко Александр Васильевич	Параллельная реализация алгоритма решения задач динамики пучков заряженных частиц методом "частицы-в-ячейках"
Россия	Khabakhrasheva T.I.	Хабахпашева Татьяна Ивановна	Entry and exit of an elastic shell on a thin layer of the water
Россия	Максимов В.В., Нуднер И.С.	Максимов Василий Васильевич	Взаимодействие гравитационных волн с частично проницаемыми преградами
16:30 перерыв			
Август, 28 (день второй)			
Секция 2 зал "Мало езеро" гостиницы "Сунчани Врхови"			
16:45 Председатели: Predrag Rajković, Георгий Алексеевич Хабахпашев			
Россия	Архипов Д.Г., Верещетин И.А., Хабахпашев Г.А.	Хабахпашев Георгий Алексеевич	Неустойчивость линейных и нелинейных гравитационных волн на границе раздела двухслойного течения Пуайзеля
Россия	Перегудин С.И., Холодова С.Е.	Холодова Светлана Евгеньевна	О геострофических движениях во вращающемся сферическом слое неоднородной электропроводной жидкости
Россия	Якубайлик Т.В., Компаниец Л.А.	Якубайлик Татьяна Валерьевна	О некоторых аналитических решениях модели ветрового движения вязкой несжимаемой жидкости (трехмерный случай)

	Россия	Мартюшов С.Н.	Мартюшов Сергей Николаевич	Расчет дифракции ударной волны на теле как тест на точность по времени явного алгоритма
	Россия	Захаров Ю.Н., Гейдаров Н.А.	Захаров Юрий Николаевич	Устойчивость решения стационарной задачи о течении вязкой несжимаемой жидкости, вызванной заданным перепадом давления
18:30	Завершение работы			
Август, 28 (день второй)				
Секция 3				
зал "Президент" гостиницы "Сунчани Врхови"				
14:30	Председатели: Vladica Stojanović, Saule Джумаканова Маусумбекова			
Сербия	Odalović M.T., Petković D.M.	Odalović Mihajlo T.		A stochastic model of gamma-ray induced charge in silicon dioxide films of mos transistors
Сербия	Popovic B., Stojanovic V.	Stojanovic Vladica		Discrete autoregressive model of conditional duration
Сербия	Stamenkovic N., Stojanovic V.	Stamenkovic Negovan		Signal processing simulation based on the residue number system
Сербия	Mitić D.Z., Petković D.M.	Petkovic Dejan		Characterization of heavy doped semiconductors using analytical approximation of Fermi integrals

	Сербия	Petrović L., Stanojević D., Dimitrijević S.	Stanojević Dragana	Statistical causality, weak solutions and marginal problems of stochastic differential equations driven with brownian motion
	Сербия	Raicevic A., Prica B.	Raicevic Anđelija	One solution for differential equation for non-linear mode PLL loop
16:30	перерыв			
Август, 28 (день второй)				
Секция 4	зал "Президент" гостиницы "Сунчани Врхови"			
16:45	Председатели: Šemal Doličanin, Виктор Константинович Андреев			
	Сербия	Petkovic D., Petrovic M.	Petrovic Milena	A truly third order finite volume scheme on quadrilateral mesh
	Россия	Косоголов О.М., Макаров А.А.	Макаров Антон Александрович	Spline wavelet decomposition and parallel compression
	Сербия	Radosavljević D., Ristić J., Milojević S., Milenković N.	Radosavljević Dragana	MS Excel in mathematics
	Сербия	Božinović M.	Božinović Milan	Mathematical model of monopoly competition
	Сербия	Popovic Z., Bogdanovic S.	Popovic Zarko	Mathematical modelling of capital reinsurance
	Сербия	Minic S.G., Vorkapic M., Tanaskovic D.	Minic Sinisa	Using LABWindows programs in acquisition and processing of data at the measurement resistant thermometer
	Сербия	Bogdanović Z., Radenković B., Barać D., Despotović M.	Radenković Božidar	Creating adaptive moodle-centric courses using business intelligence

18:30	Завершение работы		
Август, 29 (день третий)			
Секция 1 зал "Холидей" гостиницы "Сунчани Врхови"			
14:30	Председатели: Dojčin Petković, Наргозы Турсынбаевич Данаев		
Черногория	Pavićević Z.	Pavićević Žarko	Hyperbolic geometry, curvilinear angles and points of porosity in investigation of boundary properties of functions
Сербия	Mandak A.	Mandak Alija	On construction weighted projective plane of order 4 and $(2, 4 - 1)$ -quasigroup
Сербия	Ljajko E., Pavičić Z.	Ljajko Eugen	Geogebra and high school analytic geometry instruction
Сербия	Radenković N.	Radenković Nataša	Data warehouse solutions for CRM
16-30	перерыв		
Август, 29 (день третий)			
Секция 1 зал "Холидей" гостиницы "Сунчани Врхови"			
16:45	Председатели: Milograd Vanjanin, Аманбек Жайнакович Жайнаков		
Босния и Герцеговина	Pikula M., Vladičić V.	Vladičić Vladimir	About structures on the set of triangles
Черногория	Meštrović R., Pavićević Z.	Meštrović Romeo	Topologies on the Privalov spaces with applications in the theory of Banach algebras
Сербия	Gajic L.	Gajic Ljiljana	A fixed point theorem for mappings with a contractive iterate at a point on D^* -metric spaces

Кыргызстан	Жайнаков А.Ж., Аширбаев Б.Ы.	Жайнаков Аманбек Жайнакович	Аналитическое конструирование линейного регулятора по сингулярным возмущениям
Босния и Герцеговина	Vuković M.	Vuković Mirjana	Krasner's and Vuković's Paragraduations
Сербия	Stevanović M.R.	Stevanović Milorad	Spence birational transformation in series
18:30	Завершение работы		
Август, 29 (день третий)			
Секция 2			
зал "Мало езеро" гостиницы "Сунчани Врхови"			
14:30 Председатели: Hranislav Milošević, Александр Васильевич Старченко			
Сербия	Milošević H.	Milošević Hranislav	Application of low-temperature plasma in steel-making converters
Россия	Казаков А.Л.	Казаков Александр Леонидович	Применение обобщенной задачи Коши для описания сложных течений газа с ударными волнами
Россия	Старченко А.В., Барт А.А., Беликов Д.А., Данилкин Е.А.	Старченко Александр Васильевич	Мезомасштабные модели высокого разрешения для исследования качества атмосферного воздуха в городах
Сербия	Petrović V. V.	Petrović Vera	Kinetics of sintering with mathematical theory of Gropjanov
Россия	Амелина Е.В., Голушко С.К., Юрченко А.В.	Юрченко Андрей Васильевич	Вычислительные аспекты моделирования и анализа поведения композитных пластин и оболочек

	Россия	Гаврилов А.А., Дектерев А.А.	Гаврилов Андрей Анатольевич	Численное моделирование нестационарного кавитационного течения при обтекании гидрокрыла
16:30	перерыв			
Август, 29 (день третий)				
Секция 2				
зал "Мало озеро" гостиницы "Сунчани Врхови"				
16:45	Председатели: Nathan Blaunstein, Леонид Борисович Чубаров			
	Россия	Андреев В.К.	Андреев Виктор Константинович	Движение двух теплопроводных жидкостей в цилиндрической трубе
	Израиль	Blaunstein N.	Blaunstein Nathan	Modeling of Radio Propagation in the Land- Satellite Link through the Stormtime Ionosphere
	Сербия	Dolicanin C., Nikolic V., Radojkovic M.	Nikolic Vera	Mathematical models and application of numerical methods in solving a phenomenon of the theory of thin plates
	Россия	Федотова З.И., Хакимзянов Г.С.	Федотова Зинаида Ивановна	Нелинейно-дисперсионные уравнения мелкой воды на вращающейся сфере.
	Казахстан	Маусумбекова С.Д., Найманова А.Ж.	Маусумбекова Сауле Джумамакановна	Численное моделирование обтекания сжимаемым потоком двух тел, расположенных тандемом
	Россия	Садовская О.В., Садовский В.М.	Садовская Оксана Викторовна	Численное моделирование процессов распространения волн в упругопла- стических и сыпучих средах на многопро- цессорных вычислительных системах

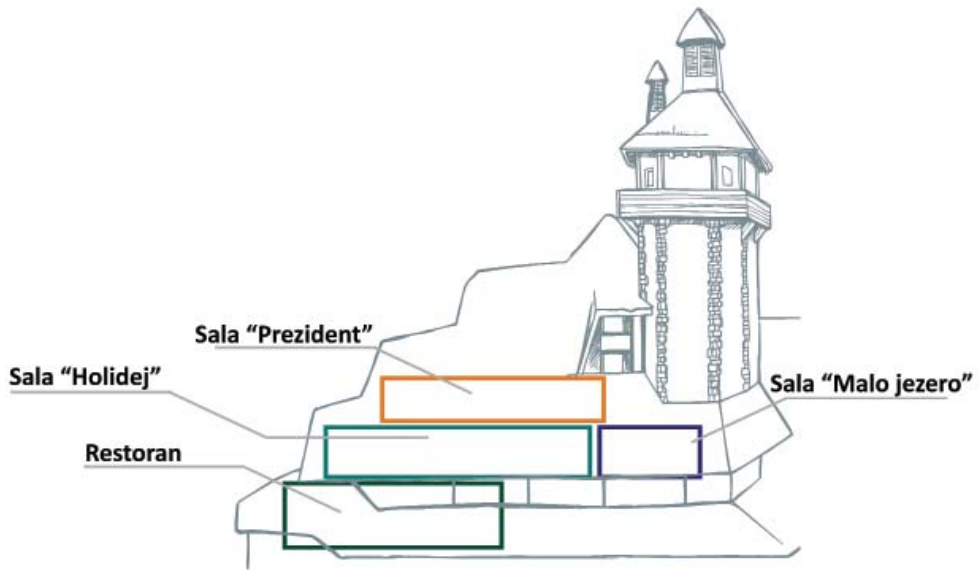
Россия	Любашевская И.В., Банщикова И.А.	Любашевская Ирина Васильевна	Деформирование пластин из сплавов с разными свойствами на растяжение и сжатие при ползучести
18:30	Завершение работы		
Август, 29 (день третий)			
Секция 5			
зал "Президент" гостиницы "Сунчани Врхови"			
14:30			
Председатели: Damijan Radosavjević, Михаил Петрович Федорук			
Россия	Шокин Ю.И., Федорук М.П., Чубаров Д.Л., Юрченко А.В.	Федорук Михаил Петрович	Об организации деятельности ресурсных центров распределенной информационно-вычислительной среды
Сербия	Milosavijevic S., Trajkovic S.	Milosavijevic Srdjan	M-commerce i savremene telekomunikacione tehnologije
Россия	Лямина В.А., Зольников И.Д., Королюк А.Ю., Добрецов Н.Н., Смоленцев Б.А., Глушкова Н.В.	Добрецов Николай Николаевич	Картографирование и мониторинг гетерогенных ландшафтов методами ГИС и ДЗ
Россия	Мартысевич У.В., Болдырев И.И., Добрецов Н.Н.	Добрецов Николай Николаевич	Методики коррекции и предварительной обработки мультиспектральных данных для моделирования геологических и ландшафтных обстановок
Россия	Якубайлик О.Э.	Якубайлик Олег Эдуардович	Геоинформационная Интернет-система мониторинга состояния окружающей природной среды в зоне действия предприятий нефтегазовой отрасли

	Россия	Массель Л.В.	Массель Людмила Васильевна	Интеграция распределенных информационных ресурсов для исследований энергетики
	Сербия	Radosavljević D., Trajkovic S., Ralevic P., Panic S.	Radosavljević Damnjan	Information system of student services done in programs C++
16:30	перерыв			
Август, 29 (день третий)				
Секция 5 зал "Президент" гостиницы "Сунчани Врхови"				
16:45	Председатели: Dragan Radovanović, Николай Николаевич Добрецов			
	Сербия	Valjarevic A., Radovanović D., Birovljev N.	Valjarevic Aleksandar	Application of Geographical information system on the maps
	Россия	Пчельников Д.В., Добрецов Н.Н., Сладких Л.А.	Добрецов Николай Николаевич	Построение системы прогнозирования урожайности на основе объектно-ориентированной архитектуры систем мониторинга
	Россия	Решетникова Г.Н.	Решетникова Галина Николаевна	Следящие системы адаптивного управления экономическими процессами
	Сербия	Banjanin M., Drakulić G.	Milorad Banjanin	Interoperability of information-communication and spatial information infrastructure
	Россия	Рогалев А.Н.	Рогалев Алексей Николаевич	Исследование безопасности сложных систем и оценки областей допустимых отклонений
	Сербия	Radosavljević D., Trajkovic S., Predrag R., Petrovic S.	Radosavljević Damnjan	Creating WEB applications using FrontPage and Access
18:30	Завершение работы			

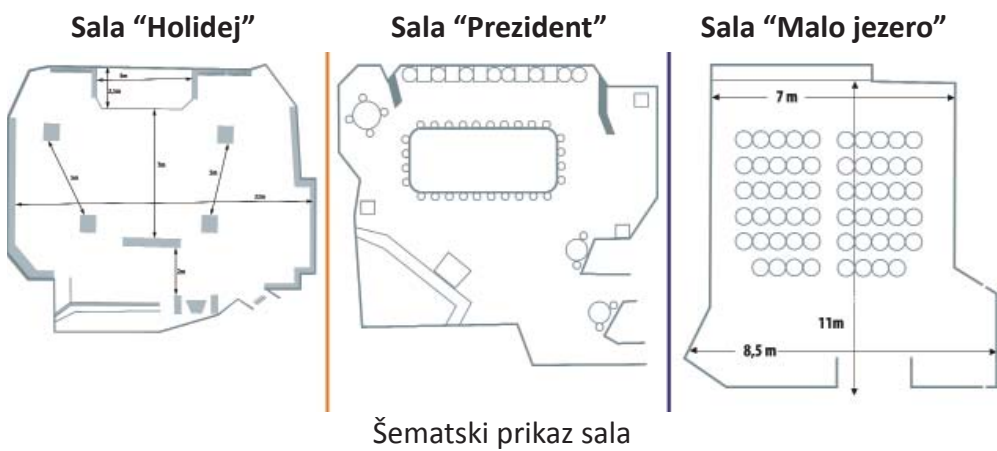
СТЕНДОВЫЕ ДОКЛАДЫ		
Страна	Авторы	Докладчик
Сентябрь, 1 (день шестой)		
Председатели: Владимир Викторович Шайдуров, Юрий Николаевич Захаров		
Россия	Варыгина М.П., Садовский В.М.	Садовский Владимир Михайлович
Россия	Захаров Ю.Н., Гейдаров Н.А.	Захаров Юрий Николаевич
Россия	Маджара Т.И.	Маджара Тарас Игоревич
Россия	Захаров Ю.Н., Иванов К.С.	Захаров Юрий Николаевич
Россия	Бекежанова В.Б.	Бекежанова Виктория Бахытовна
Казахстан	Даирбаева Г.	Даирбаева Гульзаата
		Параллельные вычисления в задачах динамики моментного континуума Коссера
		О градиентном расширении метода последовательной верхней релаксации (SOR) решения систем линейных и нелинейных алгебраических уравнений
		Адаптивная технология решения задач оптимального управления с вычислительными особенностями
		Численное решение трехмерных нестационарных уравнений Навье-Стокса в переменных «вихрь - векторный потенциал»
		Неустойчивость стационарного двухслойного течения жидкости при наличии продольного градиента температуры
		Градиентные методы решения некорректной задачи Коши

Сентябрь, 2 (день седьмой)			
Председатели: Виктор Михайлович Белолипецкий, Сергей Кузьмич Голушко			
Россия	Банщикова И.А.	Банщикова Инна Анатольевна	Моделирование анизотропной ползучести с использованием теории Хилла
Россия	Архипов Д.Г., Хабахпашев Г.А., Литвиненко А.А., Сафарова Н.С.	Хабахпашев Георгий Алексеевич	Сравнение численных решений по различным моделям для нелинейных планарных волн на свободной поверхности неглубоких жидкостей
Казахстан	Камалова Г.А., Рамазанова Г.И.	Камалова Гаухар Абдумуталиповна	Численное моделирование взаимодействия твердых частиц с газовым потоком
Россия	Шайдуров В.В., Щепановская Г.И.	Владимир Викторович Шайдуров	Вычислительный эксперимент сферически-симметричного моделирования глубинной геодинамики

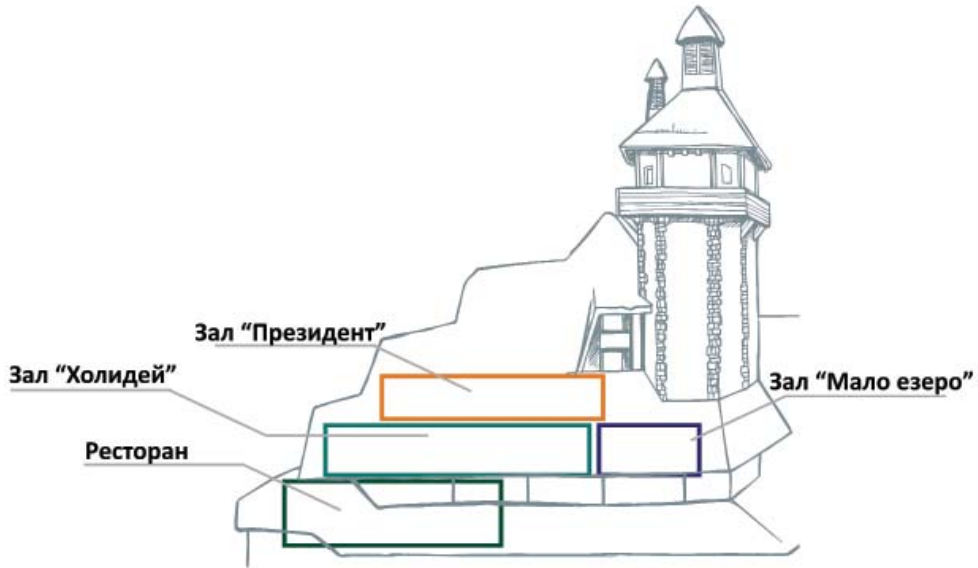
Сентябрь, 3 (день восьмой)			
Председатели: Гульнар Тулгаевна Балакаева, Игорь Вячеславович Бычков			
Россия	Шокин Ю.И., Клименко О.А., Рычкова Е.В.	Рычкова Елена Владимировна	Рейтинг сайтов научных организаций Республики Сербия
Россия	Кобалинский М.В., Сибгатулин В.Г., Симонов К.В., Перетокин С.А., Худобердин И.Р., Краснораменская Т.Г.	Кобалинский Михаил Викторович	Информационно-вычислительная технология для оценки геодинамических рисков
Россия	Чернякова Н.А.	Чернякова Наталья Александровна	Использование метода Монте-Карло в оценках надежности элементов конструкций
Россия	Москвичева Л.Ф., Буров А.Е., Богульская Н.А.	Москвичева Людмила Федоровна	Модульный магистерский курс «Системы автоматизированного проектирования и инженерного анализа»
Россия	Решетников М.Т.	Решетников Михаил Терентьевич	Математика и информационные технологии в российских образовательных стандартах
Россия	Шарапов Р.В., Шарапова Е.В.	Шарапов Руслан Владимирович	Определение ссылочного спама на основе анализа контента
Россия	Шигаров А.О.	Шигаров Алексей Олегович	Система автоматизации извлечения табличной информации из электронных документов разных форматов



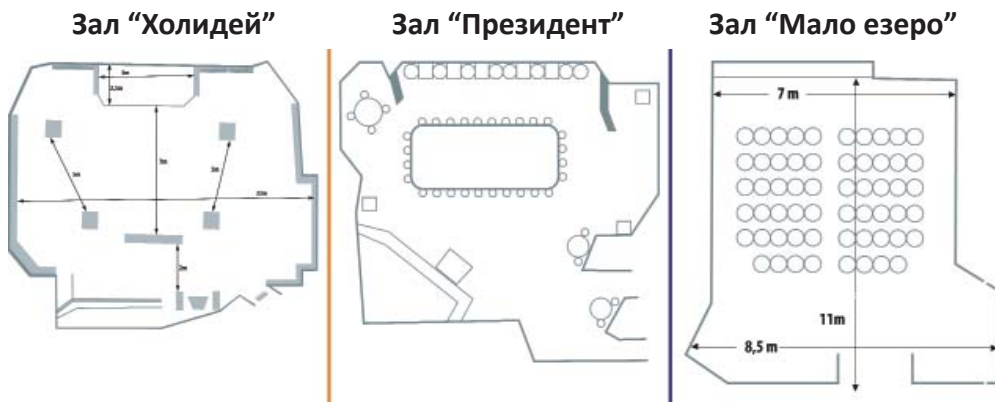
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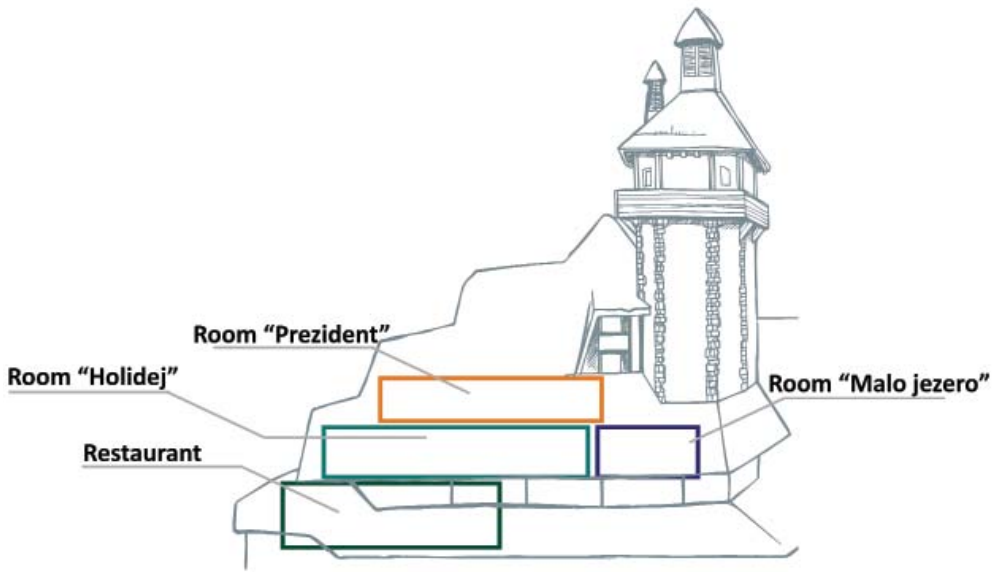
Šematski prikaz sala



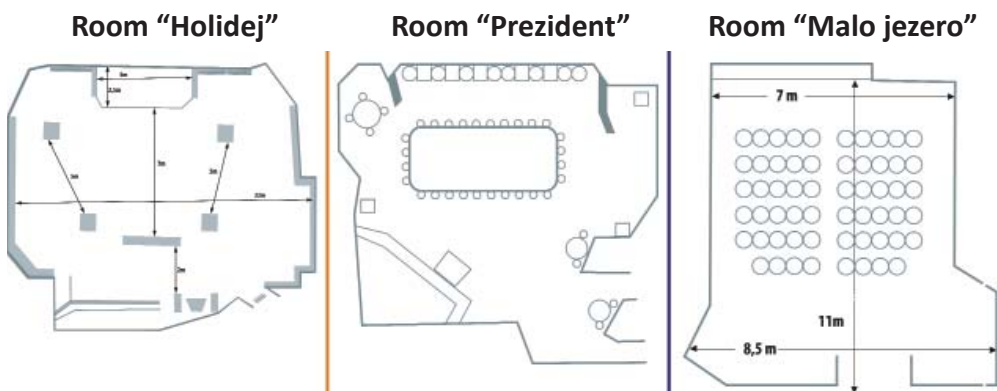
Местоположение залов



Схемы залов



Conference rooms position



Conference rooms scheme

ABSTRACTS

Afanasiev K.E., Kemerovo State University, Kemerovo

Rein T.S., Kemerovo State University, Kemerovo

Karabtcev S.N., Kemerovo State University, Kemerovo

Numerical simulation hydrodynamics problems with free boundaries by natural element method

One of the most complex for numerical simulation classes of hydrodynamics problems is the problems with the free boundaries accompanying with strong - nonlinear deformation of fluid flow. Essential drawback of classical numerical mesh methods, such as boundary element method, finite element and finite difference methods, is impossibility to continue computation after changing of coherency of calculation area. For example, breaking wave can be calculated till the moment of contact of a crest of a wave with its sole, further spend calculation begins impossible by virtue of change coherency of calculation area and tipping over boundaries. The given methods are suitable only for modelling an initial stage of the physical phenomenon. Complex research of such phenomena needs development of numerical methods, not critical to the specified complexities of calculation.

With development of conditionally meshfree numerical methods, such as Meshfree Finite Element Method (MFEM) [1] and Natural Element Method (NEM) [2], became possible to modelling of the processes concerned with breaking waves in an incompressible fluid flow. In the present work interaction of a soliton wave with a rectangular body, located at the bottom, is solved by modified Natural Element Method. Variable parameters of a problem are the amplitude of a wave, width and height of a body. The behaviour of a wave in the last before breaking the moments of time is essentially nonlinear, that complicates numerical modelling this phenomenon. From the lead series of calculations influence of whirlwinds is established, formed near to a body, on amplitudes of the past and reflected waves.

In the present work modification of NEM - the Generalized Natural Element Method (GNEM) [3] is submitted, which allows to receive decisions of problems of dynamics of viscous fluid flows with free boundaries and also to calculate hydrodynamical characteristics of modelled physical process. The dam breaking problem is solved by GNEM and comparison of the received results with experimental data is presented. The time analysis of hydrodynamical loadings on vertical walls of area for various values of height of a fluid layer at the basis is carried out.

Creation of effective realizations of numerical algorithms represents doubtless interest and the big practical value. Use of these methods allows to expand a class of decided problems and to receive new results.

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Amelina E.V., ICT SB RAS, Novosibirsk
Golushko S.K., ICT SB RAS, Novosibirsk
Yurchenko A.V., ICT SB RAS, Novosibirsk

The aspects of numerical methods implementation when modeling and analyzing the behavior of composite plates and shells

We are considering the problems of numerical modeling and the behavior analysis of composite plates and shells. Thus problems are especially brightly shown in case we use nonclassical improved theories of plates and shells in a combination with structural models of a composite material. One of the peculiarities of corresponding boundary-value problems is the presence of rapidly changing components in their decisions and strong boundary effects. Because of that the use of traditional numerical schemes and algorithms becomes impossible.

The offered approach to the solving of two-dimensional boundary-value problems of theories of plates and shells is in the reducing of the dimension of a problem. It is reached by representing the components of the solution in the form of finite trigonometrical series. The order of a system of ordinary differential equations of the final one-dimensional problem is generally proportional to the number of kept harmonics in the series expansion of required functions. Though there are parameters of the initial problem of the stressed-deformed state of composite plates and shells determination at which the final one-dimensional boundary value problem can be splitted into several independent sub-problems with the smaller order of the system of equations.

To solve the aroused one-dimensional boundary-value problems two methods are used: the method of discrete orthogonalisation, realized by authors in software package GMDO, and the method of spline-collocation, realized in software package COLSYS. The application of two essentially different numerical methods allows us to raise the reliability of received results. Wide researches of possibilities and peculiarities of using of the method of discrete orthogonalisation use for solving ill-conditioned boundary-value problems of mechanics of composite plates and shells are conducted. The algorithms of an automatic choice of a grid step and a distribution of orthogonalisation nodes are developed to provide stable calculation process.

The application of offered techniques is demonstrated on the solution of problems of determination and analysis of the stressed-deformed state of the round multilayered reinforced plates with the round central or displaced aperture. The question of necessary number of harmonics kept in series is investigated. The comparison of efficiency of numerical algorithms is carried out. Besides, the influence of a choice of used variants of the theory of plates and shells, models of a composite material on results of calculations, structural parameters of a composite material and geometrical parameters of plates on their stressed-deformed state is investigated. In that specific case, at isotropic layers and the central aperture, analytical solutions are received and used to investigate accuracy of applied numerical algorithms.

Andreev V.K., ICM SB RAS, Krasnoyarsk

The motion of two heat conducting liquids in a cylindrical pipe

We shall consider the joint non-stationary motion of two immiscible viscous heat conducting liquids with a common interface in a cylindrical pipe. Suppose, that the densities, the kinematic viscosities and the thermal diffusivities of the liquids are positive constants. We also assume that there are no external mass forces acting on the liquids. Under these assumptions, the equations of continuity, momentum and energy in the cylindrical coordinates admit the specific one-parameter subgroup of transformations. The invariant solution corresponding to this subgroup can be interpreted as follows. Suppose that on the cylindrical interface between liquids the surface tension linearity depends on the temperature. Initially, the liquids are at rest and occupy the cylindrical domains, respectively. At the initial time the temperature fields which are linearity depend on coordinate along pipe, instantly created in the whole domains. The thermocapillary effect and non-stationary pressure gradients induce the motion of liquids. In this motion, the interface remains cylindrical surface and the trajectories are straight lines parallel to the axes of pipe. The liquid layer near rigid wall of pipe may be interpreted as a lubricant. The required velocities and temperatures can be called as the perturbations of the quiescent state of liquids. Substituting the invariant expressions of the velocities and temperatures in the governing equations and taking into account the conditions on the interface, we obtain the three conjugate initial boundary value problems for unknowns. These problems can be solved successively.

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Arkhipov D. G., Kutateladze Institute of Thermophysics SB RAS, Novosibirsk

Khabakhpashev G.A., Kutateladze Institute of Thermophysics SB RAS, Novosibirsk

Vereschetin I.A. Kutateladze Institute of Thermophysics SB RAS, Novosibirsk

Instability of linear and nonlinear gravity waves on an interface of the two layered Poiseuille flow

The stability of the two layered Poiseuille flow in a plane horizontal channel is considered. The problem in the linear order is reduced to a pair of Orr – Sommerfeld equations with homogeneous boundary conditions on the interface, lid and bottom of the channel. As is well known there are many modes of disturbances with different phase velocity. Although the linear stability problem of two superposed immiscible viscous liquids was detailed researched [1] no special attention was paid to gravity mode. However interac-

books [1–3]). However, most models (e.g., papers [4–6]) are applicable only to nonlinear waves propagating chiefly in one direction. Only in these cases the problem is reduced to one equation for the perturbation of the free surface. For this reason, finite-amplitude waves travelling simultaneously in different directions can be described only by systems of equations incorporating both the disturbance of the free boundary and the fluid velocity. In the systems proposed earlier (for example, [7–9]), even the linear terms of all equations involve terms depending on the fluid velocity. The new combined system of equations, which is more well-behaved was proposed in the paper [10]. There are assumed that liquid is incompressible, its stationary flow is absent, the disturbance amplitudes are small but finite, characteristic horizontal lengths of waves and of the bottom topography are larger and the thickness of unsteady viscous boundary layer is smaller than the fluid depth, and finally, capillary effects are moderate. The initial system of the Stokes equations and of the continuity equation for the shallow water above a gently sloping bottom was reduced to one basic nonlinear evolution equation for spatial perturbations of the free surface and two linear auxiliary differential equations for a determination of the horizontal velocity vector averaged over the layer depth which is contained in the main equation only in one term of the second order of smallness. The suggested model is suitable for finite-amplitude waves running on any angles. Even in the case of inviscid liquids this approach is in essence easier than known systems of equations, where all equations contain both linear and nonlinear items (e.g., [7–9]). Some solutions of our model equations were found numerically. The calculations according to the model [6] were performed with the help of the implicit three-layer difference scheme, which is described in detail in the paper [11]. This scheme has the second order of approximation in all variables. The results of several numerical experiments for a transformation of initially plane moderately long nonlinear waves were adduced in the paper [11] too. A dynamics of the three-dimensional disturbance which is solitary in the space were demonstrated in the paper [12]. The calculations according to the model [10] were carried out in the following way. At the step “predicator” the calculations were made with the help of the simplest replacement for the velocity vector. At the step “corrector” the velocity vector was determined using the simple linear auxiliary equations. Poisson’s equation for a determination of the velocity vector was resolved by the method of the fast Fourier transformation by both horizontal coordinates on the each step of time. Formally the evolution equation of the model [6] allows to study a collision of two plane waves running towards each other. But it is shown that at the point of time of their maximal interaction the calculation error may be equals 10 % approximately. A comparison of the numerical results for three-dimensional solitary in the space perturbations of small but finite amplitude was carried out too. Some test solutions were found in the pools with different topographies. As it should be not only the changing of the wave velocities but also the intensification of disturbances moving towards the lower liquid depth and other-

tures, Scenarios, Societies], where for each “S” there is a concept and relation in which they take part. The general meaning of the MAS ontology can be presented as an arranged set $\Omega=(\text{Ontol_Concepts}, \text{Ontol_Rels})$ [3], in which *Ontol_Concepts* represent a family of ontology concepts, and *Ontol_Rels* a family of relations between the concepts.

This work focuses on ontologies for multiagent systems that are now increasingly used in modelling the distributed and autonomous characteristics of different entities involved in logistic flows. Knowledge and information on logistic flows originate from different participants, so efficient communication and inter-exchange of information between agents should be based on ontologies. Ontologies have the role of semantic knowledge organization and as such they simplify sharing and reuse of knowledge between the participants in supply chain. In that way it is possible to increase responsibility and efficiency of logistic processes, whereas an application of ontology on all entities in supply chain enables the efficient increase in materials, finance and information flow management in different phases of supply chain.

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Banjanin M., Faculty of Philosophy, Pale
Drakulic G., Faculty of Technical Science, Novi Sad

Interoperability of information-communication and spatial information infrastructure

The relatively newer idea in projects of European Union is about information-communication (IC) and spatial information infrastructures interoperability. This work is focused on specificities of transportation markets in the designing of the new and optimization of existing portfolio of services through „3-eff“ integration of the technical, human, finance and IC resources in the different space domains. Efficient IC infrastructure of transportation may be achieved only through the application of authentic registers (or „key registers“) for warehousing critical data which are interoperable in the wider geographic space and accessible for the cooperation, coordination and collaboration by the multiple usages of different users. Spatial information and information-communication infrastructure for transport services The complex approach to the analysis of spatial information infrastructure (SII) and information-communication infrastructure (ICI) in transport industry enables the reinforcement of transport service realisation processes, namely the augmentation of their quality and level of user desires satisfaction. Simultaneously, this work represents an important resource for the design of transport

Beisel S., Institute of Computation Technologies SB RAS, Novosibirsk
Chubarov L., Institute of Computation Technologies SB RAS, Novosibirsk
Kit E., Faculty of Engineering, Tel-Aviv
Levin A., Coastal and Marine Engineering Institute Ltd, Haifa
Shokin Yu., Institute of Computation Technologies SB RAS, Novosibirsk
Sladkevich M., Coastal and Marine Engineering Institute Ltd, Haifa

Анализ возможных волн цунами у Израильского берега Средиземно-го моря

В рамках совместного Российско-Израильского проекта рассмотрены возможные источники волн цунами в Средиземном море, которые могут проявиться у израильского берега. С этой целью проанализированы исторические сведения о цунами в рассматриваемом регионе. В рамках модели мелкой воды проведено предварительное численное моделирование распространения волны цунами от источников, расположенных в разных регионах Средиземного моря (Сицилия, Эгейское море, южное побережье острова Крит, Кипр и районы в непосредственной близости к израильскому морскому шельфу). В качестве источников цунами были рассмотрены как тектонические механизмы, связанные с землетрясением, так и подводные оползни на израильском шельфе. В результате анализа имеющихся данных и предварительного моделирования было получено, что заметные значения высот волн цунами могут быть получены от источников, расположенных на израильском шельфе, а также от источников, расположенных на юге от Кипра. Даже большие волны, источники которых расположены в районе Сицилии и в Эгейском море слабо проявляются у израильского берега. В качестве примера, приводятся результаты моделирования и натурная запись Греческого цунами 9 июля 1956 года. При этом событии в районе источника высота волны достигала около 30 м, а у израильского берега (Яфо) высота волны составила только около 20 см, что было зафиксировано мареографом и получено нашим моделированием.

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Beisel S., Institute of Computation Technologies SB RAS, Novosibirsk
Chubarov L., Institute of Computation Technologies SB RAS, Novosibirsk
Khudyakova V., Novosibirsk Federal University, Novosibirsk
Shokin Yu., Institute of Computation Technologies SB RAS, Novosibirsk

Modeling of landslide mechanism of tsunami wave generation near the Mediterranean coast of Israel

Настоящая работа посвящена исследованию влияния особенностей реального рельефа дна на характеристики волнового режима, порождаемого движением подводного оползня. Используя в качестве моде-

ли оползня простейшее представление в виде твердого тела, авторы рассматривают различные типы движения, отличающиеся способами учета геометрических свойств рельефа подстилающей поверхности. Постановка задач для вычислительных экспериментов учитывает особенности рельефа дна акваторий, прилегающих к средиземноморскому побережью Израиля, а также соответствующие геодинамические условия. Авторами предложена иерархия модельных акваторий, позволяющая исследовать влияние различных эффектов на процесс волнообразования. Для моделирования волновых процессов в работе используются различные приближения теории мелкой воды (линейное, нелинейное и нелинейно-дисперсионное). По результатам вычислительных экспериментов определены базовые неизменные характеристики волновых процессов и параметры, зависящие от особенностей законов движения оползня. Обсуждаются вопросы важности учета нелинейных и дисперсионных эффектов на различных стадиях развития исследуемых процессов. Анализ полученных в ходе исследования результатов показал, что в случае сильной неоднородности распределения угла наклона подстилающей поверхности вдоль трассы движения оползня, что, в частности, имеет место у Средиземноморского побережья Израиля, учет этого угла может существенно изменить амплитуды волн, генерируемых движением оползня типа «слайд». Эффект нелинейности естественно проявляется на мелководье, определяя характерные особенности отраженной от берега и распространяющейся в мористом направлении волны. Дисперсия оказывает свое влияние в области средних глубин, в том числе и на параметры волн, возникающих при остановке оползня, а также на мелководье. Это влияние проявляется в уменьшении абсолютных значений порождаемых волн понижения и в образовании характерного цуга диспергирующих волн.

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Bekezhanova V.B., Institute of computational modelling SB RAS, Krasnoyarsk

Instability of stationary two-layer fluid flow with longitudinal gradient of temperature

Many applications challenge scientists with the problem of common motion of two liquid media contacting along some surface and stability of such motion. Side by side with free convection mechanism the cause of these motions is thermocapillary effect. In the present work we consider plane stationary flow of two immiscible incompressible viscous heat-conducting liquids with common interface. Having assumed that the surface tension coefficient

Blaunstein N., Ben-Gurion University of the Negev, Beer-Sheva

Modeling of Radio Propagation in the Land-Satellite Link through the Stormtime Ionosphere

This paper presents the intensity and phase fluctuations dependence on the degree of ionospheric plasma perturbations occur during magnetic storm based on experiments by GPS monitoring of the ionosphere. During this natural phenomenon, anomalous absorption caused by decrease of the total electronic content, and fast fading of GPS radio signals caused by generation of plasma small-scale irregularities are observed experimentally. In order to present the effect of scattering caused by plasma irregularities generated during magnetic storm, 2-D phase-screen model is introduced. A satisfactory explanation of fading phenomena observed experimentally is presented based on the corresponding theoretical framework. It was found that during magnetic storm, when experimentally observed deviations of plasma density in the perturbed ionosphere can be changed at 10%-20%, the corresponding small-scale and moderate-scale plasma density irregularities in the storm-time F region yield strong fast fading of VHF/UHF radio signals with sufficient signal intensity fluctuations (up to 10%) and phase fluctuations (up to hundreds radians), which finally can significantly decrease the spectral efficiency, capacity and signal data rate in multipath land-satellite communication link with fading passing through the perturbed ionosphere.

Bogdanovic Z., Faculty of organizational sciences, Belgrade

Radenkovic B., Faculty of organizational sciences, Belgrade

Barac D., Faculty of organizational sciences, Belgrade

Despotovic M., Faculty of organizational sciences, Belgrade

Creating adaptive moodle-centric courses using business intelligence

This paper describes a method for creating adaptive Moodle courses based on learning styles using business intelligence techniques and tools. Building an effective e-learning framework depends on finding adequate means for discovering users' interests, preferences, motivation and needs. Data mining and its techniques are discussed as the most appropriate and sophisticated tools for swiftly determining students' learning styles and classification into groups. Each group attended an adapted Moodle course. The evaluation of the system showed that students achieved better results with higher level of satisfaction when attending courses adapted to learning styles. An experiment was conducted within the distance education system of Laboratory for E-Business, Faculty of Organizational Sciences in Belgrade.

Cvejic S., Faculty of science and mathematics, Kosovska Mitrovica
Lekic M., Faculty of science and mathematics, Kosovska Mitrovica
Dimitrovski D., Faculty of science and mathematics, Skopje

Properties of coefficients of analytical periodic functions

If function $f(x)$ is analytical, then it can be presented by convergent exponential sequence which, due to its convergence (d'Alembert's criterium), can be differentiated and integrated, member by member and as a rule it has Taylor's coefficients. However, in this work we have determined the properties of coefficient sequence when function is analytical, but also periodic with period ω . We have also shown that for the periodic function the coefficient sequence has the following form

$$a_k = \frac{\varphi^{(k)}(\omega)}{k!} = \frac{\varphi^{(k)}(2\omega)}{k!} = \frac{\varphi^{(k)}(n\omega)}{k!}$$

In this way we have obtained infinite number of Taylor's formulae which are valid near the points $0, 2\omega, \dots, n\omega$.

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Dairbayeva G., Al-Farabi Kazakh National University, Almaty

Gradient methods of solving Ill-Posed Cauchy problem

Let Ω be a bounded simply connected domain in $R = \{(x,y)\}$ with a continuous piece-smooth boundary $\Gamma = \partial\Omega$. Let Γ be divided into two connected parts $\Gamma_1 \cup \Gamma_2 = \Gamma$,

$$\Gamma_1 \cap \Gamma_2 = \emptyset.$$

Consider the following problem

$$\Delta u = 0, \quad (x,y) \in \Omega, \quad (1)$$

$$u|_{\Gamma_1} = f(x,y), \quad (x,y) \in \Gamma_1, \quad (2)$$

$$\left. \frac{\partial u}{\partial n} \right|_{\Gamma_1} = 0. \quad (3)$$

The problem (1)-(3) is ill-posed according to Hadamard. The solution is unique, but it is not stable with respect to a small perturbations of the function f . In this connection we use the solutions of the stable boundary problems for the same differential equation (1) instead of solving the ill-posed problem (1)-(3). Such idea was proposed by Kabanikhin S.I. and Karchevskiy A. L. [1], and developed in [2].

of relations between stress and strain conditions, which has been described by differential equations, simple and partial. Methods used for solving of established equations, with respect of outline and initial conditions, may be classified in analytical and numerical. In case of complex and big construction systems subjected to the arbitrary loads, including a complex boundary conditions, solving of differential equations by analytical methods is almost impossible. Then the solution is application of numerical methods. One of the basic numerical methods is Finite Difference Method (FDM) based on replacing of differential equations with corresponding difference equations. Using of this method, the problem come to solving of system of paired algebraic equations, making the problem more easier for solving. In this paper, besides FDM, is also used Finite Element Method (FEM) for consideration of this phenomenon in flat isotropic field, respectively at thin plates with different boundary conditions and loadings. In the end, more comments and farther directions of investigations are given.

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Fedotov A.M., NSU, Novosibirsk

Information resource intergation problems

The given report to development of the technology buildings of the distributed integrable systems of the processing, keeping and issues information resource on base opened specification of the models data.

The model of “virtual environment for interchange of the results of scientific researches” would be discussed – the enterprise or regional information system, which integrates the systems for scientific research and organizing activity. Its distinctive feature are: complex support of scientific activity, orientation at various categories of users such as graduates, researchers, managers, secretaries, etc.

The researches that generalize applying of introduced technology for using at regional-scaled applications was done. Functioning to intellectual informational systems in terms of informatics was described, the needs for information of scientific society explored.

Technological approach for exchanging catalogized data and integrating informational systems was tested while creating new and modifying existing systems for storing and exchanging bibliographical records. Another important result is creating of unified informational space for researching in environmental science.

Models, procedures and interfaces of registration the politician of the control of access in a control system of access to the distributed information

resources (CSADIR) are developed. Completion created before prototype CSADIR for research of model of the distributed management by access is in addition spent. Thus, conditions for transition to performance of a following stage of works under the project pre-production operation of the test monitoring system of access to resources and the analysis of this operation will be which primary goal are created.

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Fedotova Z.I., ICT SB RAS, Novosibirsk

Khakimzyanov G.S., ICT SB RAS, Novosibirsk

The nonlinear dispersive equations of shallow water on a rotating sphere

In the paper the nonlinear dispersive equations of a shallow water on a rotating sphere are derived. The received equations are completely nonlinear. The opportunity of a moveable bottom surface is taken into account. The new model will be useful to the description of long waves (tsunami) over vast latitudinal and longitudinal directions of water areas during long time.

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Fionov A., Siberian State University of Telecommunications and Informatics, Novosibirsk

Ryabko B., Siberian State University of Telecommunications and Informatics, Novosibirsk

Information-Theoretic Methods for Solving Steganography Problem

Сегодня в сфере защиты информации велик интерес к проблемам *стеганографии*, т.е. (говоря упрощённо) методам внедрения скрытой информации в файлы, и *стегоанализу*, т.е. методам выявления скрытой информации. Оба эти направления развиваются параллельно и взаимно обогащают друг друга. Несмотря на достигнутый прогресс, всё ещё остаётся большое поле для исследований как путей повышения стойкости стегосистем, так и увеличения разрешающей способности методов стегоанализа. В настоящем докладе представлены результаты, полученные авторами в течение нескольких последних лет совместно с их аспирантами и магистрантами на основе применения идей и методов теории информации, прежде всего, универсального кодирования источников. Ранее эти идеи с успехом были применены для построения просто реализуемых идеальных шифров, а также для криптоанализа генераторов псевдослучайных последовательностей и блоковых шифров, см. [1].

Рассмотрим вначале суть теоретико-информационного подхода к задачам стеганографии. В одной из первых работ в этой области [2] было введено понятие *совершенной* стегосистемы, т.е. такой системы внедрения данных, для которой в принципе не возможно создать алгоритм выявления факта наличия скрытой информации. При построении совершенной стегосистемы контейнер рассматривается как сообщение, порождённое вероятностным источником, а (зашифрованные) данные, которые необходимо внедрить – как последовательность равновероятных и независимых нулей и единиц. Необходимо так внедрить данные, чтобы вероятностная структура контейнера осталась той же самой. Тогда заполненный контейнер становится сообщением того же источника, что и пустой, поэтому невозможно сказать, присутствует скрытая информация или нет. Впервые конструкция совершенной стегосистемы для источников конечной памяти с неизвестной статистикой была предложена в [3]. Эта конструкция основывается на идеях нумерационного кодирования и в простейшем случае может быть пояснена следующим примером. Рассмотрим источник без памяти над алфавитом $\{a,b\}$. Допустим, источник породил сообщение *aaba*. Мы не знаем вероятности появления этого сообщения, однако с уверенностью можем сказать, что она та же самая, что и для сообщений *baaa*, *abaa* и *aaab*, т.к. они содержат одинаковое число букв *a* и *b*. Все эти четыре сообщения принадлежат одному классу эквивалентности – классу равновероятных сообщений для данного источника. Теперь мы можем скрыть два бита информации, используя отображение $00 \rightarrow aaab$, $01 \rightarrow aaba$, $10 \rightarrow abaa$, $11 \rightarrow baaa$. Как видим, скрываемая информация – это просто номер в лексикографически упорядоченном множестве равновероятных сообщений. Таким образом, чтобы скрыть информацию, нужно решить задачу *денумерации* для заданного сообщения и типа источника. Извлечение скрытой информации выполняется путём определения номера сообщения, т.е. решения задачи *нумерации*. Авторами построены эффективные методы нумерации и денумерации для широкого класса источников, включая марковские источники произвольного порядка.

Не все контейнеры, используемые в практической стеганографии, например, цифровые фотографии, можно точно описать некоторым случайным процессом. Однако построение приближённой вероятностной модели этих контейнеров часто оказывается полезным. Такая вероятностная модель (явная или неявная) строится, например, при сжатии графических файлов. Мы предлагаем использовать вероятностные модели для решения задач стеганографии. В этом случае внедряемое сообщение перекодируется таким образом, чтобы кодовые символы подчинялись тем же распределениям вероятностей, что и заменяемые ими символы в контейнере. Быстрые методы кодирования, обеспечивающие в точности заданные вероятности появления кодовых символов, пред-

ложены в [4]. Иногда целесообразно использовать методы, приближённо решающие эту задачу, например, арифметическое декодирование. Нами построен алгоритм внедрения информации в растровые изображения, учитывающий статистику младших бит цветовых составляющих в некотором окружающем контексте. Экспериментальные исследования алгоритма показали его заметное преимущество в стойкости по отношению к известным аналогам: увеличение стойкости на 15–40 % на случайной выборке файлов и на 95 % на «удобных» файлах (с плавными переходами цветов) по отношению к известным программам HIDE4PGP и STEGOTOOLS.

Применение идей теории информации для решения задач стегоанализа основывается на теоретическом фундаменте, построенном в [5, 6]. В этих работах было показано, как можно использовать методы универсального кодирования для эффективного решения многих задач математической статистики. Для стегоанализа графических файлов, в частности, важно уметь решать задачу выявления степени статистической зависимости младших бит цветовых составляющих или частотных коэффициентов от остальной информации в файле. Дело в том, что при внедрении информации эта статистическая связь искажается или теряется вовсе. Наиболее успешная практическая реализация этих идей была выполнена при построении системы стегоанализа BMP-файлов [7], а затем и JPEG-файлов. Основная идея состоит в сравнении степеней сжатия полученного файла и этого же файла с различным уровнем внедрения в него случайных данных. Если разность степеней сжатия превышает некоторый порог, делается вывод о наличии в полученном файле скрытой информации. В результате экспериментальных исследований на выборке из 1000 файлов было установлено, что ошибка первого рода (пустой контейнер принимается как заполненный) не превосходит 1 %. При уровне внедрения информации 40 % и выше ошибка второго рода (заполненный контейнер признаётся пустым) не превосходит 2 %. Совокупность этих показателей лучше, чем у известных методов, таких как STEGDETECT.

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on the operator-splitting techniques for non-steady form of continuity and flow equation, there is proposed the scheme of the Douglas-Rachford type for problems with strong coupling between pressure and density fields. The numerical implementation of this scheme is performed as a predictor-corrector procedure similar to SIMPLEC algorithm. The simulation of flows over a number of axisymmetric cylindrical bodies and a planar hydrofoil at various cavitation numbers has been performed for the purpose of cavitation models and numerical methods verification. The numerical modeling of the cavitating turbulent flow over the hydrofoil has predicted a development of the self-oscillating mode. On the rear side of hydrofoil near to a head part the vapor cavity is formed. In the tail of cavity the re-entrant jet is observed, resulting in the separation of vapor cavities and development of the bubbly flow mode. The obtained numerical results are compared to available experimental data for the pressure field distribution, Strouhal number and the maximal length of the attached vapor cavity.

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Golushko S.K., ICT SB RAS, Novosibirsk

Golushko K.S., ICT SB RAS, Novosibirsk

On certain statements of inverse problems in mechanics of composite plates and shells and methods of a solution thereof

Тонкостенные изделия типа пластин и оболочек являются важнейшими элементами многих современных конструкций атомной энергетики, авиационной, космической и машиностроительной техники, глубоководных аппаратов, строительной индустрии.

При анализе работоспособности и надежности таких конструкций, их экономической эффективности первостепенное значение имеют расчеты их прочности, жесткости, обеспечения минимального веса и стоимости. Высокие удельные прочностные характеристики традиционных материалов (сталей, алюминиевых, магниевых и титановых сплавов) достигли своего предела и возможности их дальнейшего прогресса невелики. Значительное повышение требований к современным конструкциям, заставило использовать при их изготовлении новые композиционные материалы. Принцип армирования высокопрочными и высокомодульными волокнами открыл пути к практически неограниченному совершенствованию современных композитных конструкций, сочетающих высокие показатели прочности, жесткости, надежности с другими ценными качествами: относительно малым весом, регулируемыми свойствами электро и теплопроводности, высокой

стойкостью к агрессивным средам и т.п.

В работе рассматриваются некоторые новые постановки обратных задач механики тонкостенных однородных, слоистых и армированных пластин и оболочек. Обсуждаются возможные критерии рационального и оптимального проектирования однородных и гибридных конструкций. Представлен оригинальный метод решения широкого класса задач рационального проектирования композитных конструкций. Исследован ряд конкретных задач рационального проектирования армированных оболочек, когда в качестве критериев рациональности выступают требования безмоментности и безызгибности напряженно-деформированного состояния, равнонапряженности арматуры, постоянства удельной потенциальной энергии оболочки.

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Gourary M. M., IPPM RAS, Moscow

Rusakov S. G., IPPM RAS, Moscow

Stempkovsky A. L., IPPM RAS, Moscow

Ulyanov S. L., IPPM RAS, Moscow

Zharov M. M., IPPM RAS, Moscow

Numerical Aspects of Adaptive Harmonic Balance Method in Circuit Simulation

The Harmonic Balance (HB) is the powerful and efficient method of steady-state analysis in many practical simulation problems in particular in nonlinear automatic control systems, in electrical simulation and others. HB is the frequency-domain technique of nonlinear simulation and it has well known advantages in comparison with time-domain steady-state simulation. In particular, applying to simulation of nonlinear radio frequency (RF) circuits it finds solutions efficiently for problems with widely separated time constants and also with multitone excitation. However, though the conventional HB method is well suited for weakly and mildly nonlinear problems it has essential limitations for analysis of strong nonlinear circuits. Actually the each variable is presented by a truncated Fourier series, resulting in a system of equations of order $ORD=(2K+1)N$, where K is the number of terms in the Fourier series (harmonics) and N is the number of state variables in the analyzed circuit. To obtain desired accuracy highly nonlinear problems require a large number of harmonics, which may increase the size of the system to be solved beyond practical limits. Therefore the problem of solving of large dimension system is the key computational problem of the HB technique. New techniques are required to extend the Harmonic Balance method for solving strong nonlinear problems. New computational approach - Adaptive HB Analysis (AHBA-

model and the developed algorithm and program of calculation may be used for studies of nonstationary processes related to connection and interruption of arcs, transient processes and use of alternating current sources. Besides, this computation method allows to study stability of stationary solution produced by the relaxation method.

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Kamalova G.A., Institute of Mathematics, Almaty

Ramazanova G.Y., Institute of Mathematics, Almaty

Numerical modeling of interaction of solid particles with a gas flow

In the present work the injection of two-phase gas-dispersed flows (air-solid particles) are simulated. For the solution of the problem the Euler-Lagrange approaches is used. The mechanism of an interchange of gases with particles is studied.

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Karepova E.D., Institute of Computational Modelling SB RAS, Krasnoyarsk

Malyshev A.V., Institute of Computational Modelling SB RAS, Krasnoyarsk

Shaidurov V.V., Institute of Computational Modelling SB RAS, Krasnoyarsk

Research of efficiency of parallel realization of FEM for boundary problem of shallow water equations

In this work efficiency of some parallel realizations of an algorithm for the numerical solution of a boundary-value problem for the shallow water equations which were performed with the help of the MPI library for C language is compared. The first approach is based on the decomposition of a computational domain without overlapping subdomains, the second approach is based on the decomposition with shady sides. Theoretical estimates of acceleration for the parallel algorithm are given. Numerical results for a model grid and nonstructured grid for the Okhotsk sea are presented. Results concerning acceleration of computations depending on the number of processes, the type of communication realization, and the method of the decomposition of a computational domain are presented.

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not taking into account of real properties of creep at the decision of applied problems of details shaping and forecasting of their further exploitation can result in essential mistakes which can reach one order and more.

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Madzhara T., Institute for System Dynamics and Control Theory SB RAS, Irkutsk

Adaptive technology for the numerical solution of the optimal control problems with the computational peculiarities

В докладе рассмотрен класс задач оптимального управления с вычислительными особенностями, описаны подходы, позволяющие успешно находить оптимальные решения. В целях автоматизации процесса решения таких задач разработан интеллектуальный динамический планировщик - компонент программного комплекса, имитирующий действия эксперта при работе с программным комплексом в диалоговом режиме. Представлена формальная модель эксперта, на основании которой разработан планировщик, приведена архитектура программного комплекса, учитывающая возможность решения задач рассматриваемого класса. Работоспособность разработанного программного комплекса проверена на пакете тестовых задач и ряде модельных прикладных задач из области биохимии и аэродинамики.

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Mandak A., Teacher-training Faculty of Prizren, Leposavic

On construction weighted projective plane of order 4 and (2, 4 – 1)-quasigroup

We introduce a notion of weighted projective planes which is a generalization of usual projective planes. We prove that a Frobenius group G of order 10 operates on a projective plane P of order 4 as a colineation group. Using this operation the plane P may be constructed. A weighted projective plane P' of order 4 is equivalent to a totally symmetric (2, 4 – 2)-quasigroup.

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Martysevich U.V., Institute of Geology and Mineralogy for SB RAS, Novosibirsk

Boldyrev I.I., Institute of Geology and Mineralogy for SB RAS, Novosibirsk

Dobretsov N.N., Institute of Geology and Mineralogy for SB RAS, Novosibirsk

Multispectral satellite data correction and preprocessing techniques for simulating of geological and landscape conditions

Despite great achievements in Earth remote sensing techniques so far visual image interpretation based on knowledge of decoding indications of considering objects is applying most of time then using multispectral data for geological purposes. Recognition of rock types on multispectral satellites images of cross-country areas and areas with presence of vegetation is difficult. Attempt of integrated solution of research of natural rock outcropping components specificity in spectral characteristic of satellite images including influence of landscape and vegetation is undertaken in presented article. Different methods of satellite images topographic correction are analyzed in the proceeding. Such as methods to minimize influence effect of variable illumination of surface in visible and infrared spectral bands. And also were analyzed different techniques for suppression of vegetative spectral contribution in areas with partial growth. Verification and evaluation of satellite data spectral correction results was done by example of test polygons with different typical landscapes with consideration of field data: assessment of vegetation fill, grain composition, contents of forming minerals in rocks, illumination. It was found that vegetation type and illumination range (for regions with compound relief) impact on reflectance of rocks more than their grain and mineral composition. Technique of shadow suppression on satellite pictures may be used for studies of different landscape properties: spectral and visual assessment of vegetation properties located on low illuminated mountainsides and modeling of landscape parts contributions (vegetation, underlying surface, illumination). Topographic correction is promising with respect to resolving of geological problems: satellite images classification for geological subjects in mountain areas where identical rocks may have different reflectance because of illumination differences; hidden tectonic structures recognitions without demonstration in relief.

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Martyushov S.N., State Duma of Russian Federation, Moscow

Numerical simulation of shock wave diffraction on the body as the test for time accuracy of explicit algorithm

At calculations of stationary or slowly varying flow near a flying body the main attention gives to increase the accuracy of the decision on spatial co-

ordinates. Sometimes large time step is used for achieving of stationary decision. The other situation appears for numerical simulation of essentially non-stationary processes. So for diffraction of a shock wave on a flying body, there is the impulse of displacing forces generating non-stationary forward and rotary movement of a body. Change of a trajectory, a direction of movement and speed in turn change value and the direction and value of influence to a body. There is a problem with a feedback. For such problems the error of calculation on time coordinate is integrated at calculation of integral characteristics of flow, first of all works of displacing forces and, in consequence of it, sizes of displacement, a direction of movement or a turn of a body. As the result absolutely different decisions can be received, depending on time accuracy of algorithm. Diffraction of a shock wave on the free and fixed sphere in a shock tube was numerically simulated. Two similar numerical algorithms were used: TVD schemes of Harten and Chakravarty. In the first case the second order of approximation on time in a multidimensional case was reached by splitting of the operator of a step on symmetric sequence of operators of a step in coordinate directions. In the second case time approximation of Runge-Cutta of different orders of accuracy was used. Calculations were made on sequence of structured elliptic grids. Points of grid were condensed on the surface of sphere. The algorithm of grid construction is based on the decision of system of Poisson equations. Results of calculations show essential change of integral characteristics of flow with increasing of decision accuracy.

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Massel L.V., Energy Systems Institute named L.A. Melentiev SB RAS, Irkutsk

Interaction of the distributed information resources for the power engineering research

Energy Systems Institute named Melentiev L.A. of SB RAS carry out researches of energy systems and fuel and energy complex (FEC). These researches are associated and have common information base. For the receiving of valid conclusions and recommendations prepared for the outside organizations was proposed virtual integration of separate data bases and knowledge bases. Knowledge bases are realized as ontology space joining some ontology's of energy applied fields. Integration is made in the bounds of information infrastructure included into IT-infrastructure of power engineering research. In information infrastructure picked out three stratum: the first stratum is metadata model of information infrastructure, the second is metadata stratum

tum and the third is data stratum of IT-infrastructure. For the making of meta-data model are used ontology's. The objects of IT-infrastructure are described by metadata on the base of creating ontology. The program components of information infrastructure are divided on three logical levels: file system level, DBMS level and client level. In information infrastructure there are system and applied components. System components are Program core, Metadata base, File store, Administrative program and Repository driver. Applied components are Data retrieval program, File retrieval program, Web-application for the revision of Repository, SOAP-interface and others. The realization of all program components of information infrastructure made accordance with SOA conception. The central component is Repository which was realized on the base of DBMS Firebird 1.5.2 and Microsoft SQL Server 2000/2005.

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Mausumbekova S.D., Al-Farabi Kazakh National University, Almaty
Naimanova A. VNS Institute of mathematics, Almaty

Numerical modeling of a streamlining two bodies in tandem in the air flow

Численно моделируется процесс образования и взаимодействия вихрей при обтекании потоком воздуха двух тел, расположенных тандемом. Исследовано влияния расстояний между препятствиями на вихреобразование. Определены расстояния между препятствиями, при которых происходит интерференция завихренности (эффект резонанса).

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Maximov V.V., St. Petersburg State University of Technology and Design, St. Petersburg
Nudner I.S., Research Centre for Capital Construction, St. Petersburg

The interaction of gravity waves with the partially permeable obstacles

The interaction of surface waves with the maritime works having permeable members is considered. The waves of relatively small height are studied. The liquid is ideal and incompressible, and its motion has the potential function. The theoretical problem is solved by the eigenfunction expansion method. The solution is compared with the experimental data. The analysis shows the satisfactory agreement.

Milosavljevic S., Faculty of Economics, Kosovska Mitrovica

Trajkovic S., Faculty of Science and Mathematics, Kosovska Mitrovica

M-commerce i savremene telekomunikacione tehnologije

Mobile telecommunications is a link that connects people anywhere to be found. Voice and data over the mobile telecommunication network enables the sending of information and perform transactions on a new and unique way. They create a new business domain called mobile business or m-commerce, which is an expanded foundation of Internet e-business with many unique features built. As a basic platform, mobile telecommunication networks play a crucial role in the mobile business today. Technical characteristics of mobile telecommunications and their development is determined by the base for mobile business. In this paper we study and present the technical characteristics of mobile telecommunication technology of 1g network to 3G and beyond.

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Milosevic H.M., Faculty of Science and Mathematics, Kosovska Mitrovica

Application of low-temperature plasma in steel-making converters

With the use of numerical modeling an investigation of the process of the jet gunniting of the walls of a steel-making converter is considered. By the jet gunniting is meant the process of making an additional protective refractory coating on the basic lining of the walls of the steel-making converter with the aid of a system of two-phase jets transporting a softened refractory material (magnesite) to the converter wall. The results of numerical modeling agree quite satisfactorily with the experimental results in terms that the highest penetration rate of particles takes place in the region of high temperatures near the nozzle block axis into which the particles migrate under the action of turbulent fluctuations of the carrying gas flow.

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Milovanovic G., College of Computer Science, Beograd

Numerical treatment of Fredholm integral equations

In this lecture we introduce and discuss some numerical methods, based on new results of polynomial approximation, for solving Fredholm integral equations of the second kind in the spaces of continuous functions equipped with

monitor and measure the temperature bands have a need for automation of data, which is realized in combination with virtually instruments.

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Mitic Z. D., Faculty of Technical Science, Kosovska Mitrovica

Petkovic M. D., Faculty of Science and Mathematics, Kosovska Mitrovica

Characterization of heavy doped semiconductors using analytical approximation of Fermi integrals

In heavy doped semiconductors the charge carriers have energy distribution according Fermi-Dirac function. Because that the carriers concentration and electric field and potentials in surface layers versus Fermi level relations are expressed as Fermi integrals. In this paper we are analyzed some analytical approximations of Fermi integrals order of one half and tree half and their applicability for calculation of carrier concentrations and surface electric field in heavy doped semiconductor. These results are also applicable on polycrystalline grains of polysilicon films.

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Moskvichev V.V., Presidium of Krasnoyarsk Scientific Center of SB RAS, Krasnoyarsk

Applied problems in probabilistic risk-analysis of technical systems

The study presents generalization of causes of failure and classification of the limit states for complex technical systems (CTS). Proposed are models and algorithms for risk-analysis of CTS, and data base for applied problems solving. Calculations are based on probabilistic models of defects, crackresistance properties, loading conditions, and stress-strain and limit states. Assessment of structural risk is determined by the fracture probability of structure elements for a given type of limit state. Model calculations of risk-analysis are carried out for a number of CTS constructions including components of nuclear and space engineering, pressure vessels and pipelines.

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Pchel'nikov D.V., Institute of Geology and Mineralogy for SB RAS, Novosibirsk
Dobretsov N.N., Institute of Geology and Mineralogy for SB RAS, Novosibirsk
Sladkih L.A., Data Reception and Processing Center for West Siberian Region, Novosibirsk

Crop forecasting system based on object-oriented monitoring concept

Crop yield forecasting is very important task for agricultural development in Siberian region. Nowadays all information concerning arable lands usage in Russia is provided by farmers. Lack of reliable information points at the necessity of development of agriculture monitoring system based on remote data, which will be independent from the information provided by the farmers. Since 2006 Novosibirsk Meteorological Survey has been developing agriculture monitoring system for Novosibirsk and neighborhood regions. The EPIC crop yield forecasting model is used as base model with some regional adaptation. This presentation discusses usage of object-oriented GIS architecture, which is specially developed for motoring tasks, both automate data handling process and improve of measure parameters quantity, as well as greater ability of system adaptation for local and regional conditions. The main system component is the agriculture field observation model. This model is based on the observation model abstraction class, which uses different data exchange interfaces and allows using any different data sources including satellite and meteorological data as well as field observations. Supposed architecture doesn't require initial definition of the agriculture field geometry. The only base location of the monitoring object is required. It allows starting the monitoring having minimal information and then collecting the required data in process.

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Peregudin S.I., St. Petersburg State University, St. Petersburg
Kholodova S.E., St. Petersburg State University, St. Petersburg

About geostrophic motions in a rotating spherical layer of a non-uniform electrically conducting fluid

Research of mechanisms of generation of a magnetic field of the Earth owing to three-dimensional large-scale movement of the nonviscous, incompressible, non-uniform ideally spending electrowire rotating liquid concentrated in a liquid terrestrial kernel is conducted. The offered mathematical model of investigated physical process represents the closed system of the equations in the private derivatives, consisting of the equations of hydrodynamics taking into account rotation of the Earth, Lorentz's force and the corresponding equations of magnetic dynamics with necessary boundary conditions. With

use of spherical co-ordinates and scales of functions, suitable the analysis of mathematical model is made for calculation of three-dimensional movements with the big time scale and spatial horizontal scale, comparable with radius of the Earth. The basic idea of the analysis consists in construction of the scheme consecutive approach in which geostrophe approach is the first step. The specified method of the analysis allows, without being limited to heuristic reasonings, to deduce the general geostrophe equations describing movements as homogeneous, so and the stratified electrowire rotating liquid. The analytical decision of system of the nonlinear equations in the private derivatives, modelling geostrophe movement in a layer of the ideal electrowire stratified rotating liquid is received. The analysis of structure of the presented fields magnetic hydrodynamics values allows to draw a conclusion on justice of a hypothesis of S.I.Braginsky about existence of strong changes in the thin layer of a terrestrial kernel adjoining border with a cloak.

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Petkovic D., Faculty of Science and Mathematics, Kosovska Mitrovica

Arandjelovic I., Faculty of Science and Mathematics, Kosovska Mitrovica

On the convergence of diagonal approximation

In first part of this talk we present some recent results on the convergence of Diagonal approximations obtained by A.A. Gonchar and E.A. Rahmanov. Further we give solution of one conjecture proposed by A.A. Gonchar. In the last section we prove some new results.

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Petkovic D., Faculty of Science and Mathematics, Kosovska Mitrovica

Petrovic M., Faculty of Science and Mathematics, Kosovska Mitrovica

A truly third order finite volume schene on quadrilateral mesh

A third order finite volume method on a quadrilateral mesh is presented. By using quadrangles instead of rectangles as a basic element of the mesh, full generalization is archived. This work holds on a simple but valuable conservative rule: inside a certain special domain (volume) the total amount of a contained quantity (such as mass, energy, momentum) is preserved. Said in another way, the total quantity in the volume doesn't change except by flow (or due to the fluxes) across the boundary of a domain. Efficient tools for

solving the conservation laws are the finite volume methods. These methods are dealing with volumes (cells) and with averaged quantities within. In each of these cells we have exact conservation. The dynamics of the average is determined by point values of the flux along the boundary. The aim is to obtain a third order accurate numerical solution. This gives a motivation for the reconstruction of the numerical flux by some known functions (polynomial, hyperbolic, logarithmic). In this work local double logarithmic reconstruction was used. The components needed for developing LDRD functions are second order approximation to the first derivatives. These approximations are actually a crucial problem in this thesis and were solved specifically according to multidimensional numerical integration theory.

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*Petrovic I., Higher Education Institution for Electrical Engineering and Computing, Beograd
Petrovic M., Higher Education Institution for Electrical Engineering and Computing, Beograd
Spalevic P., Higher Education Institution for Electrical Engineering and Computing, Beograd*

Second order statistics of SC diversity system in the presence of fading

In this paper second order statistics of SC (Selection Combining) macrodiversity system's in presece of varius clases of input feding of macrodiversity sistem's are analized. Inputs of microdiversity sistem's are varius combining of high speed and low speed feding that are modeled with Vabull, Nakagami – m, Raly and Rice distribution. Macrodiversity SC sistem consist two microdiversity systems and opserve signal selection based on their averige outputs powers that is modeled with Gama distribution. Gained results are applied in modeling and designing of wireless communication systems, in defin ing parameters of equivalent code chanel based on Marcovie model with finite number of states, as well as assessment of posibility package errors with finite lenght.

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*Petrovic I., Higher Education Institution for Electrical Engineering and Computing, Beograd
Stefanovic C., Higher Education Institution for Electrical Engineering and Computing, Beograd
Sekulovic N., Higher Education Institution for Electrical Engineering and Computing, Beograd
Petrovic M., Higher Education Institution for Electrical Engineering and Computing, Beograd
Stefanovic M., Higher Education Institution for Electrical Engineering and Computing, Beograd*

Second order statistics of ratio of two random variables

In this paper, joint probability density function of ratio of two random variables and its first derivative is determined. Furthermore, for ratio of two ran-

dom variables, level crossing rate is derived. Random variables have Rayleigh, Rice, Nakagami-m and Weibull distribution. Obtained results can be used for evaluation the performance of mobile telecommunication systems operating over fading channels. Numerical results are presented to illustrate the proposed mathematical analysis.

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Petrovic L., Faculty of Science and Mathematics, Kosovska Mitrovica
Stanojevic D., Faculty of Science and Mathematics, Kosovska Mitrovica
Dimitrijevic S. Faculty of Science and Mathematics, Kosovska Mitrovica

Statistical causality, weak solutions and martingale problems of stochastic differential equations driven with brownian motion

The paper introduces a statistical concept of causality in continuous time in filtered probability spaces which is based on Granger"-'"s definition of causality. Then, we consider Ito's stochastic differential equation driven with a process of Brownian motion and show the equivalence between some models of causality and weak uniqueness (for weak solutions of stochastic differential equations). We also show that the given concept of causality is closely connected to the extremal solutions of martingale problem and stopped martingale problem.

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Petrovic V. V., Higher Education Institution for Electrical Engineering and Computing, Beograd

Kinetics of sintering with mathematical theory of Gropjanov

Ceramic materials have been in use in many different areas of human wellbeing for a very long time. Important domains in ceramic materials are those materials that are applied in electronics. Our research is focused on magnesium-titanate ($MgTiO_3$). Most common way of obtaining this material is by using the process of sintering. During mechanical activation inorganic materials are grinded when grain size is being reduced. Crystal structure submits distortion and also change, what is leading in some systems to chemical reaction and formation of new compound. In this work we are explaining mechanical activation influence on sintering kinetics in system $MgO-TiO_2$ with mathematical theory of Gropjanov. We noticed temperature drop and time reduction needed for $MgTiO_3$ sintering when duration of mechanical activation is longer.

Radenkovic B., Faculty of Organizational Sciences, Beograd

Information technologies and religion

The subject of this paper is analysis of the historical development of information and communication technologies as well as their connection with religion. The paper gives an overview of methods of communication between people, communication with macrocosm in which the human history goes on and communication with inner microcosm of each human being. The historical analysis aims to discovering laws and analogies that are important for creating, developing and the future of human communication regarding myths and religious sources. Internet today is the dominant media for communication in human society, and therefore represents central issue in historical analysis. Many religious, historical and scientific resources have been used while working on this paper. For the vision of future the prophets' sources have been used. The focus in this paper is also on achievements of Serbs for developing modern communication.

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Radenkovic N., Faculty of Science and Mathematics, Kosovska Mitrovica

Data warehouse solutions for CRM

In today's highly competitive business environment, CRM (Customer Relationship Management) systems, which provide the framework for analyzing customer profitability and improving marketing effectiveness, have become an indispensable component in enterprise information systems. Typically, CRM activities include data analysis, campaign design, response analysis of customer data. To effectively support such activities, a data warehouse (which is a repository that integrates information from multiple operational data sources) must be developed to act as the back-bone of CRM systems. A data warehouse is a core part that determines the performance of CRM systems and quality of CRM services.

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Radosavljevic D., Faculty of Technical Science, Kosovska Mitrovica

Ristic J., Faculty of Technical Science, Kosovska Mitrovica

Milojevic S., Faculty of Technical Science, Kosovska Mitrovica

Milenkovic N. Faculty of Technical Science, Kosovska Mitrovica

MS Excel in mathematics

Mathematics is a fundamental discipline which is used for formulating and solving real problems. Nowadays computer became mathematical tool par excellence. We can use many specialized packages of mathematical tools, such as: Matlab, MathCad etc., to facilitate problems solving. Although those programs have many advantages upon MS Excel, it can be used for solving broad class of mathematical problems. MS Excel is able to solve problems from different mathematical branches, such as: analytical geometry, linear algebra, mathematical analysis, differential equations, integral equations, probability theory, statistic, mathematics for engineering, etc.

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Radosavljevic D., High Business Technical School, Uzice

Trajkovic S., High Business Technical School, Uzice

Predrag R., High Business Technical School, Uzice

Petrovic S. High Business Technical School, Uzice

Creating WEB applications using FrontPage and Access

The paper gives a brief description of student services in the high-school institution, a description of the database performed for conducting business in the same services and described in detail as HTML for access to data in the database. Key words: Web, database, HTML pages.

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Radosavljevic D., High Business Technical School, Uzice

Trajkovic S., High Business Technical School, Uzice

Ralevic P., High Business Technical School, Uzice

Panic S., High Business Technical School, Uzice

Information system of student services done in programs C++

The paper gives a brief description of student services, concepts and methods of programming and interface description. Modeling of real programs with the help of modern technology and design simulation software includes analysis of the structure and behavior of the observed system, registration

knowledge using verbal, graphic, mathematical or logical model and the model in appropriate software. The aim of this paper is to develop and simulate the work of student services using object-oriented programming in C + +. Namely, the program should complete all the requirements of the user that contains all the necessary real elements which would be used in student services.

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Raicevic A., Faculty of Technical Science, Kosovska Mitrovica

Prca B. Faculty of Technical Science, Kosovska Mitrovica

One solution for differential equation for non-linear mode PLL loop

In this paper nonlinear mode PLL loop is shown and its differential equation is presented in detail. This equation belongs to the group of nonlinear differential equations which solution can not be found in closed form. In fact, the solution which can be found is numerical, or approximate, and variation depends on type of approximation. Of course, nonlinear mode PLL loop is not desirable, because it results in big distortions. To avoid this, we process boundary condition which gives us critical values of circuit parameters with jump phenomenon in response.

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Rajković P.M., Faculty of Mechanical Engineering, Nis

Marinković S.D., Faculty of Mechanical Engineering, Nis

Stanković M.S., Faculty of Mechanical Engineering, Nis

The fractional q-operators and corresponding equations

Based on the fractional q-integral with the parametric lower limit of integration, we define fractional q-derivative of Riemann-Liouville and Caputo type. The properties are studied separately as well as relations between them and their compositions. Also, we consider usage of Picard-Lindelof method for the solving the corresponding differential equations.

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Reshetnikov M. T., Tomsk state university, Tomsk

Математика и информационные технологии в российских образовательных стандартах

Российское (а до этого - советское) высшее образование всегда отличалось наличием фундаментальной составляющей, позволяющей студентам успешно осваивать прикладные дисциплины, а выпускникам – достаточно легко адаптироваться к реалиям рынка труда.

Если говорить об инженерном образовании, то к фундаментальным дисциплинам следует отнести, в первую очередь, математику и физику, причем математику имеет смысл поставить на первое место, поскольку современная физика базируется на математической основе.

Неразрывна связь между математикой и информационными технологиями (ИТ): математика в сложных случаях аналитически невыводимых конструкций вынуждена обращаться к численным методам, а ИТ, в свою очередь, базируются на фундаментальных математических выводах.

В этой связи представляет определенный интерес анализ места и роли математических и ИТ-дисциплин в государственных образовательных стандартах (ГОС) современного, в частности, инженерного образования, а также сравнение объемов соответствующего образования в учебных планах российских и зарубежных вузов.

Для сравнения были проанализированы три крупных направления подготовки дипломированных специалистов: «Автоматизация и управление», «Радиотехника», «Электроника и микроэлектроника». Общее число часов по учебным планам этих направлений (также, как и большинства других технических направлений) одинаково и составляет 8260 часов за 5 лет обучения. При этом количество часов, отводимых на изучение математики, также примерно одинаково – 800 – 880, что составляет около 10% от общей учебной нагрузки.

Трудоемкость ИТ-дисциплин, общих для специальностей всех трех направлений, составляет 440 – 540 часов (5 – 6% от общей трудоемкости учебных планов). В то же время за счет общепрофессионального и специального циклов дисциплин на направлении «Автоматизация и управление» существенно (до 12% - 1030 часов) увеличен объем информатики в широком понимании этого термина.

Чтобы понять, много это или мало, можно сравнить приведенные цифры с количеством часов, отводимых на гуманитарно-социальный блок: 1800 часов, или 22% от общей нагрузки (напомним, что речь идет о сугубо технических направлениях).

В рамках выполнявшегося в 2005 – 2007 г.г. проекта европейской программы TEMPUS аналогичный анализ был проведен в отношении направления «Электроника и микроэлектроника», имеющегося в

ТУСУРе и в нескольких зарубежных вузах, а именно в технических университетах и высших технических школах Делфта (Голландия), Лондона (Великобритания), Цюриха (Швейцария), Нюрнберга и Аахена (Германия).

Сравнение показало, что математике в зарубежных вузах уделяется почти в два раза больше часов: от 14,5% в Лондоне до 27% в Аахене. Удельный объем ИТ-курсов в два раза меньше, чем математических, но в то же время в два раза больше, чем в России: от 11% до 13,5% от общей трудоемкости.

Таким образом, можно сделать вывод о том, что как математическая, так и ИТ-подготовка в российских вузах остается недостаточной, особенно учитывая высокую наукоемкость и технологичность современных инженерных специальностей и направлений.

В качестве рекомендации можно было бы предложить при разработке ГОС нового поколения, во-первых, уменьшить гуманитарно-социальную составляющую учебных планов, во-вторых, оставить больше степеней свободы для самих вузов, которые смогли бы самостоятельно планировать направленность учебной нагрузки исходя из специфики подготовки специалистов.

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Reshetnikova G.N., Tomsk State University, Tomsk

Следящие системы адаптивного управления экономическими процессами

В последнее время появилось новое научное направление – динамическая экономика, когда в качестве математических моделей экономических процессов используются системы обыкновенных дифференциальных уравнений. При этом оказываются применимыми методы теории управления в пространстве состояний, разработанные для технических систем. В докладе рассматриваются алгоритмы совмещенного синтеза адаптивного управления стохастическими системами при неполной информации применительно к двум задачам управления: управление поставками, отгрузкой и хранением товара на складе; управление поставками и рекламой товара, когда темпы продаж и потребления зависят от затрат на рекламу и цены товара. При этом реклама разделяется на статическую и динамическую с различным временем воздействия. Приводятся математические модели экономических систем для рассматриваемых задач и вводятся ограничения, вид которых определяется конкретной экономической

задачей. Предлагается модификация локального критерия, что позволяет формировать управление при слежении только за прибылью. Моделирование для обеих задач осуществлялось по данным работы конкретных предприятий с целью увеличения прибыли на 5%. Результаты моделирования доказывают применимость предложенных методов к экономическим задачам управления поставками.

..... ● MIT 2009 ●

Rogalyov A. N., Institute of Computational Modeling SB RAN, Krasnoyarsk

An analysis of complex systems reliability and the estimation of maximum deviations of solutions

In this report it is offered to estimate ODE solutions bounds under action of final, constantly operating perturbations. Among mathematical descriptions of similar problems we will allocate control of the guaranteed safety conditions and reachable sets estimation. Examples of the constructed guaranteed bounds of solutions in problems of the estimation of the zones of dangerous states and threshold values of parameters are resulted.

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Rychkov A.D., Institute of Computational Technologies SB RAS, Novosibirsk

Shokin Yu.I., Institute of Computational Technologies SB RAS, Novosibirsk

Miloshevich H., Faculty of Science and Mathematics, Kosovska Mitrovica

Application of pulse aerosol system for fire fighting in coal mines

A working of pulse aerosol system of fire fighting (PASFF) for extinguishing of initiation of combustion of air - methane mixture in shaft bottom and drift of coal mines is modeling. Results of numerical experiments were shown that PASFF can stop of movement of shock wave in burning air - methane mixture and to provide effective suppression of combustion process in the mixture. Furthermore the using of PASFF may protect people and mining equipment from shock wave impact.

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Sadovskaya O.V., Institute of Computational Modelling of SB RAS, Krasnoyarsk

Sadovskii V.M., Institute of Computational Modelling of SB RAS, Krasnoyarsk

Numerical analysis of the waves propagation processes in elastic-plastic and granular media on multiprocessor computer systems

Processes of the waves propagation in elastic-plastic and granular media under small strains are analyzed within the framework of a new rheological model. The model takes into account different resistance of materials with respect to tension and compression. Constitutive relationships are formulated in the form of variational inequalities. The Mises-Schleicher destruction criterion is used to describe the granularity of medium, and the Mises yield criterion is used to determine the plasticity of grains. Algorithm for numerical realization of the model is worked out on the basis of the splitting method with respect to physical processes and space variables. For the solution of one-dimensional hyperbolic systems of equations in space directions, the explicit monotone ENO-scheme is used. Special procedure of the stresses correction is applied to take into account irreversible strains. Parallel program system is proposed for the analysis of 2D and 3D dynamic problems on multiprocessor computer systems. The programming was carried out in Fortran using the MPI library and the SPMD technology. The universality of programs is achieved by a special packing of the variables used at each node of the cluster into large one-dimensional arrays. Computational domain is distributed between the cluster nodes by means of 1D, 2D or 3D decomposition so as to load the nodes uniformly. The parallelization is performed at the stage of splitting the problem with respect to the space variables. Testing of the algorithm and the programs was fulfilled on 1D problems, a good correspondence between the results of computations and exact solutions was obtained. Numerical computations of 3D interaction of signotons (shock waves, on the fronts of which the strain changes its sign) in inhomogeneously loosened granular medium with the cumulative splash formation, computations of the waves propagation in double-layer heterogeneous medium with curvilinear interface under action of concentrated impulsive load on one of its boundaries, and also similar computations for a medium with rigid inclusion were carried out at the clusters of Institute of Computational Modeling of SB RAS (Krasnoyarsk) and Joint Supercomputer Center of RAS (Moscow). The level surfaces of velocities and stresses, seismograms of the particles displacement, on which one can see incident longitudinal and transverse waves, conical, reflected and refracted waves, the Rayleigh surface waves, were constructed on results of computations.

Shaidurov V. V., Institute of Computational Modeling SB RAS, Krasnoyarsk

Shchepanovskaya G. I., Institute of Computational Modeling SB RAS, Krasnoyarsk

The computational experiment of the spherically symmetric modeling of deep-seated geodynamics

In present paper computing model allowing considering geodynamic process of expansion, compression, heating and cooling of the Earth is suggested. Dynamic of geosphere is investigated in the context of viscous heat-conducting coercible gas when density and viscosity of medium depend on time and coordinates. Suggested model allows considering not only crust and mantle of Earth but also internal structure including Earth core. Thus, in this paper dynamics of the inner structure of the Earth is described by a model of a viscous compressible heat-conducting medium in the form of the Navier-Stokes equations. For the discretization of the spherically symmetric model the finite element method is used. The method is shown turned out to be highly sensitive to the state equation used. This results in decreasing or increasing the radius of the Earth, smoothing the boundaries of phase, chemical, or metamorphic transitions of the Earth's geodynamic layers. Therefore, in addition to the solution of the mathematical problems, a correct and accurate formulation of the state equation on the basis of the modern notion of the substance of the Earth and its physical and chemical properties at corresponding temperatures and pressures is of major importance.

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Sharapov R.V., Murom Institut of Vladimir State University, Murom

Sharapova E.V., Murom Institut of Vladimir State University, Murom

Content based link spam detection

The Internet becomes not only means of information reception and dialogue, but also business dealing means. The site finding by the most popular search queries and site position in list of search results is an actual problem for the site owners. Because sites of one subjects sometimes happens too much, and everyone wishes to be at top of list of search results in queries, owners use spam of search engines (web spam). There is a considerable quantity of the techniques, used to web spam. We will consider one of them – a link spam. The increase in a links number at sites became one of the basic methods of search engines manipulation. Manipulation scales constantly grow. If several years ago the basic way was the so-called exchange of links which was spent manually now to it on change various ways of automatic placing of links have come. It is possible to allocate some variants of such placing:

1. Use of specialized programs for automatic addition of links in catalogues, guest books, forums etc.

2. Purchases of links at advertising brokers.

With the first variant search engines have learnt to struggle, revealing resources where there is a possibility of simple, not moderated addition of links. The weight of links from such resources strongly decreases. Placing of links with use of advertising brokers represents much big problem for search engines.

Now in Russian segment the Internet operates about ten the large advertising brokers who are engaged in sale of text links. Only one of them, Sape.ru, has possibility to place the links on more than 55 million pages. In spite of fact that links in such systems name "advertising", their main objective - not advertising for the purpose of attraction of visitors (links take places often in the most imperceptible places of page and their user simply does not notice), and improvement of the position in search engines. Cost of such "advertising" also happens often nominal, sometimes only 0.01\$ for a month of placing.

In what the basic danger of the large-scale reference spam, observed the last some years? Danger consists that links are actively used by modern search engines for ranging of search results. With links it is connected concepts of the Quote Index in Yandex and definition PageRank in Google. The mass increase in links of an unnatural origin (link spam) can strongly "spoil" efficiency of their job. The situation becomes complicated that "paid" links can take places on any sites including on very dear and popular resources. Thus, there is impossible a simple division of pages on "good" and pages for link spam.

Detecting of Link spam

Let's consider signs of definition paid links:

1. The links noted as advertising. For this purpose it is necessary to see link vicinity (the text, adjoining to the link). Signs of paid link - words: "Advertising", "Sponsors", "Our Partners", etc.

2. The big block of links. The raised density of links on a small site of page (block of links) can testify to their unnatural origin.

3. Links to agencies on sale of links/advertising. Often near to advertising blocks it is possible to see links to advertising brokers.

4. On a site there is information on how it is possible to buy links. If on site or about the block of links such information contains, then links are paid.

5. Thematic affinity of link. If text of link or site subjects on which the link strongly conducts differs from page subjects on which the link is located it is possible to consider the link as a spam.

However definition of link subjects not always is a trivial problem. The link can settle down in the offer (though and not to be a part of body page text). Therefore to be guided by the text in immediate proximity to the link it is not always justified.

Often links specify in a resource with enough general subjects (for example, at references to the source of news or a site of the author of any article).

For correct definition of link subjects deep analysis site subjects on which link conducts can help. This problem difficult also demands time considerable quantity.

6. Thematic affinity of next links. For this purpose it is necessary to analyze subjects of group links placed on page. If links are not thematic and have disorder of subjects, they are advertising.

7. The location of links. For this purpose it is necessary to analyze an arrangement of links on page. Than further the link from the basic maintenance of page, it is especially probable, that they are advertising. For example, often such links take places in the bottom of page or in the right column when the body text settles down in the middle.

8. Code of links. Many automated systems of links placing (stock exchange, exchangers, brokers) establish code automatically on template. Presence of identical links block on code can specify in their spam origin.

9. Dynamism/time of links life. Frequent change of links on pages without change of other maintenance can testify to their unnatural origin. Links can or disappear for a while simply from pages (in case of malfunctions of systems on automatic placing of links), or their part can be replaced with new links.

10. The message on paid links. Competitors, the former buyers of links, the former employees can inform on paid links.

11. Viewing of page by person. Viewing of pages by a moderator and detect link spam manually.

Algorithm of link spam detection

Now we will consider the algorithm, capable to detect spam links. It consists of several stages.

Stage 1: Formation of a preliminary set of spam links S . The set is formed of following references:

- chosen manually;
- defined by algorithm early, as spam;
- defined by analysis of advertising brokers code.

The greatest interest represents last way. Some advertising brokers have distinctive features in placing of codes which could help to identify.

One more method consists in tracing of dynamics of change of the maintenance of page. If during time for page the group of links this group can be paid links changes only.

It is necessary to notice, what not all links defined by algorithm as a spam should be brought in set S but only what signs of a spam have obviously expressed character (to exclude casual hit of links in the spam category).

At a stage 1 it is possible to use various algorithms classification and machine training.

Stage 2: Detection of spam links on the basis of page content. The basic idea

consists in the analysis of page content and detecting of spam signs. For each spam sign the foul shot is imposed on the link q_i . If the total foul shot exceeds a certain threshold, the link admits a spam.

Step 1. The page is scanned on presence of links S_b , put into list S generated at the Stage 1. At detection of such links the area round them is scanned. If links are found out, it is appointed a foul shot q_1 which size decreases in process of removal from link S_b .

Step 2. The page is scanned on presence of signs of the advertising block. As a sign can serve words "Advertising", "Sponsors", "Our Partners" etc. At detection of advertising block signs, to links in its vicinities is appointed a foul shot q_2 .

Step 3. The page is scanned on presence of links to the advertising broker. At detection of such signs of the advertising block, to links in its vicinities it is appointed a foul shot q_3 .

Step 4. The page is scanned on presence of information on sale of links (and about what can be bought). At detection of such signs, to links in their vicinities it is appointed a foul shot q_4 .

Step 5. Page is scanned on presence of the big block of links. If the quantity of links in the block more than a certain threshold, is appointed it a foul shot q_5 .

Step 6. Links are scanned on signs of a code of the advertising broker in case of which detection to links it is appointed a foul shot q_6 .

Step 7. Conformity of subjects of the link and the general subjects of page is checked. In case of discrepancy, the link it is appointed a foul shot q_7 . For subjects check often happens simply enough to scan the page text on coincidence of words to the link text.

Step 8. Conformity of subjects of the link and subjects of links in its vicinities is checked. In case of discrepancy, the link it is appointed a foul shot q_8 .

Step 9. The place of placing of the link is checked. If the link is in the end of page, to it is appointed a foul shot q_9 .

Stage 3. The analysis of site structure for the purpose of spam revealing. This stage is the most difficult. Its purpose - to reveal features of structure of a site and a place on pages where there are "paid" links. For this purpose from site pages all changing content (except links) leaves. Further association of pages with an identical template in clusters is made. The following stage: for each cluster repeating links leave and areas where links vary on everyone cluster pages are identified. For the links entering into such areas it is appointed a foul shot q_r .

Stage 4. For each link all added foul shots are summarized. If the sum exceeds a certain threshold, the conclusion, that the link is spam. In this case the link is put into list S .

Results

The offered algorithm shows good results in definition of spam links. Precision of algorithm is 0.94, Recall - 0.89.

Outcomes of theoretical researches of the developed algorithms and computing experiments for three-dimensional diffraction (transmission) problems of acoustic, elastic and electromagnetic waves are described. The work was carried out under financial support of the RFFI and FEB RAS (grants 08-01-00947, 09-I-P2-01).

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Stamenkovic N., Faculty of Science and Mathematics, Kosovska Mitrovica

Stojanovic V., Faculty of Science and Mathematics, Kosovska Mitrovica

Signal processing simulation based on the residue number system

Signal processing simulation based on residue number system in program package MATLAB is shown in this paper. Digital signal processing, based on residue arithmetic's, allows high speed signal processing that consist only operations of addition and multiplication. In the course of signal processing operation of division and condition code in the suggested arithmetic operations should be avoided. Program package MATLAB does not contains software for signal processing simulation in residue number system. Goal of this paper is development of software for signal processing simulation in MATLAB, with 31st order finite impulse response filter based on residue number system. Software should consist MATLAB functions for basic operations in residue number system , as well as functions for converting numbers from fixed point to integer and contrariwise. Results of filter response for unitary array and simply periodic function are shown.

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Starchenko A.V., Tomsk State University, Tomsk

Bart A.A., Tomsk State University, Tomsk

Belikov D.A., Tomsk State University, Tomsk

Danilkin E.A., Tomsk State University, Tomsk

Mesoscale models for urban air quality research with high resolution

The results of application of developed meteorological and photochemical mesoscale models for numerical prediction of aerodynamics, physical and chemical processes above a city are presented. The main features of the meteorological model are possibility of explicit representation of some specific for urban territory ('heat iceland') atmospheric phenomena and taking

each process, i.e. the process with a minimal amount of particles gets maximal amount of particles to be injected on the new time-step.

We illustrate the application of the proposed approach on the simulation of the thin tubular magnetized monoenergetic electron beam transportation in equipotential cylindrical drift channel. Obtained solution on the Skif Cyberia Cluster at Tomsk State University shows a good agreement with solution of the same task using well-known PIC codes OOPIC and KARAT and with analytical solution.

Performance tests show good efficiency defined as ratio of parallel program real acceleration to theoretical acceleration, calculated according to the Amdahl law.

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Cherniakova N.A., Institute of Computational Modelling SB RAS, Krasnoyarsk

Use of the Monte-Carlo analysis for reliability assessments of structure elements

In this study, reliability assessment of structures by Monte-Carlo analysis is considered. Distribution functions of durability and structure operational safety under certain exploit conditions are taken as parameters for reliability calculation. It is assumed that the source of failure is a crack of random size. Loads and material properties are also considered to be stochastic with known probability density functions.

Calculation model for the crack growth rate is defined by a modified Volkov-Mikheev's empirical relationship, which variables are assigned by a random number generator at given probability distribution laws.

Calculated are the estimates for statistical reliability of structure elements with growing cracks (typical weld joints, pressure vessels, handling facilities, main pipelines).

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Valjarevic A., Faculty of Science and Mathematics, Kosovska Mitrovica

Radovanovic D., Faculty of Science and Mathematics, Kosovska Mitrovica

Birovljev N., Primary school "Gavrilo Princip", Beograd

Application of Geographical information system on the maps

Communication, through ages of civilization is based on signs. A human knew to draw before he could write, and he represented his surrounding through

things from nature. Man transforms the objects from nature into symbols, thanks to his ability for visualization. Modern cartography is defined as a science of transfer of graphical information, and the chart as an informational channel. Language of a cart is graphics, and cartography symbols are graphic elements. Map is a graphic-visual model of the space and cartography communication is graphic-visual communication. Then Geographical information system is necessary for processing more and more informations. Today is age of digital maps.

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Varygina M.P., Institute of Computational Modelling SB RAS, Krasnoyarsk

Sadovskii V.M., Institute of Computational Modelling SB RAS, Krasnoyarsk

Parallel Computations in the Problems of Dynamics of the Cosserat Continuum

Mathematical model of the Cosserat continuum can be applied for the description of stressed-strained state of composites, grained, powdered and granular media. It implicitly includes the small parameter that characterizes the size of particles in the microstructure of material. So, in order to obtain correct numerical solutions it is necessary to perform computations on grids whose mesh size corresponds to this parameter. To solve 3D dynamic problems, parallel algorithms occur to be effective, which allow to distribute the computational load among a large number of processors, and use fine grids thus improving the accuracy of numerical solution.

For numerical modeling of the propagation of stress and strain waves in the framework of the Cosserat elasticity theory, a parallel shock-capturing algorithm is worked out. Two-cyclic splitting method with respect to spatial variables and explicit monotone ENO-scheme for solving one-dimensional problems adapted to the calculation of discontinuities are used. Parallel program system is created for numerical analysis of 3D dynamic problems on multiprocessor computer systems. Comparison of numerical and analytical solutions of the problem about propagation of the Rayleigh surface waves in couple-stress medium was carried out. Computations of 3D Lamb's problem about the action of concentrated load on the surface of homogeneous elastic half-space, and also the problem about the action of concentrated impulsive periodic load were performed.

Shock waves of four types - longitudinal, transverse, torsional and rotational waves - were recognized in the seismograms, constructed by results of computations. A distinctive feature of the wave field in the Cosserat medium as compared with the classical linear elasticity theory was found, which con-

Zakharov Y.N., Kemerovo State University, Kemerovo
Geidarov N.A., Kemerovo State University, Kemerovo

Stability of solution of stationary viscous incompressible fluid flow produced by a given pressure drop problem

It's considered mostly two problem definitions for Navier-Stokes equation set which has been written relative to velocity and pressure. One of them is most popular and consists in adherence conditions demanding on solid walls and velocity demand on flow boundary parts. Second problem definition consists in pressure demanding on flow boundary parts, so that flow is realized for pressure drop. In this paper we present the results of research of one-valued numerical solvability and stability of channel fluid flow pressure drop problem.

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Zakharov Y.N., Kemerovo State University, Kemerovo
Ivanov K.S., Kemerovo State University, Kemerovo

Numerical simulation of three-dimensional non-stationary Navier-Stokes equation using «rotation - vector potential» formulation

The time-dependend incompressible Navier-Stokes equations in three-dimensions are solved numerically. In the most cases this problem is formulated using the velocity and pressure variables and solved by splitting method. The advantage of this way is the relative simplicity of the algorithm realization. However, significant disadvantage of this way is difficulties to satisfy to the continuity equation at every physical time step. This problem is discussed by many authors [1]. In this paper we propose to use «rotation - vector potential» formulation. Thus, we automatically provide the solenoidal velocity field [2]. Depending on the way of the convective terms differencing the linear or nonlinear numerical system of equations is formed at every physical time step. The system is solved using the parallel minimal residuals iterative method with the multiparametric optimization based on the componentwise minimization of the approximate solution residual norm [3]. The method allows solving the linear and nonlinear algebraic systems of equations requiring only a minimum of information about the system operator. For example, in case of the linear system of equations it doesn't require that the system operator must be symmetric or fixed sign. Proposed solving method converges sufficiently fast for any starting data. Also the convergence acceleration procedure can be applied to it that increases the efficiency of the method convergence process. The comparison of numerical solution results with lab-

космоснимков и геоинформационного моделирования позволяет картографировать не только гомогенные, но и гетерогенные наземные экосистемы, а также вести мониторинг их динамики, поскольку изменения удельных площадей элементов гетерогенных ландшафтов и пограничных образований являются чувствительными индикаторами изменений глобальных и региональных экологических факторов.

Работа выполнена в рамках проекта «Разработка системы комплексной индикации процессов опустынивания и оценка современного состояния экосистем Сибири и Центральной Азии», а также при поддержке Российского фонда фундаментальных исследований (гранты 09-05-00732, 08-04-00055).

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