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Korteweg-de Vries Institute for Mathematics

Faculty of Science

University of Amsterdam

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1. General Information

1.1. Mission Statement KdV Institute for Mathematics

The Korteweg-de Vries Institute for Mathematics (KdVI) furthers the science of mathematics, both in its theoretical and applied aspects, and aims to stimulate the application and appreciation of mathematics in other academic disciplines and in society as a whole.

For more than three thousand years people have been fascinated by numbers and geometry, and humanity has acquired a treasure house of mathematical knowledge that will never become obsolete. The cultural value of mathematics, its intellectual depth and beauty cannot be overrated.

Mathematics serves as the language of the natural sciences and of technology, and increasingly of most other scientific disciplines. As such it plays a decisive role in society and consequently in many departments and institutes of our university.

The Korteweg-de Vries Institute has high standards in research as well as in teaching, and strives to collaborate with other institutes within and outside of the Faculty of Science for well-balanced contributions to the mathematical aspects of their research, teaching, and consultancy.

The Korteweg-de Vries Institute considers it a compelling task to protect the cultural heritage of mathematics by raising the interest in the study of mathematics and to educate its students to be open-minded, dependable mathematicians.

1.2. General Overview

For some years the Korteweg-de Vries Institute has been experiencing a period of large personnel changes. In 2008 this period has come to an end with the appointments of staff members in the groups of Algebra, Geometry and Mathematical Physics (programme 1), and Pure, Applied and Numerical Analysis (programme 2).

Peters, who was originally to be appointed in 2008 in programme 2, spent one year at the the Institute for Mathematical Sciences of Stony Brook University and started in 2009.

As a result of the grants awarded in 2008 the KdVI welcomed in 2009 Bzowski (PhD, VICI Skenderis) and Buryak and Ceyhan and (PhD, resp. Postdoc, VIDI Shadrin) as the first appointments on these new projects.

In January 2009 a farewell symposium was organized in honor of Hoffmann, who retired at the end of 2008.

Doelman, part-time professor in Programme 2, accepted a position in Leiden at the Lorentz Center. He will stay connected with the KdVI and remains supervisor of one of its PhD-students.

IBIS UvA intensified its ties with the Faculty of Economics and Business. The group, which is led by Does, moved in April 2009 to this Faculty, and as a result this subprogramme in the Stochastics group ended at the KdVI.

The impact of the NWO cluster Geometry and Quantum Theory (GQT), in which the KdV Institute participates through the programme Algebra, Geometry, and Mathematical Physics, continues to be strong as many of the new appointments were supported by GQT funding. We are confident that the programme will maintain a leading role on world level for many years.

Members of the Stochastics group participate in the Stochastics – Theoretical and Applied Research (STAR) cluster. This year the cluster was accepted by NWO received a subsidy of NWO of 1.5 million Euros. In this cluster statisticians and probabilists from most Dutch universities collaborate. At KdVI the cluster will support 2 UD positions in the Stochastics group for a period of two years.

In May 2009 the KdVI moved as one of the first research institutes of the Faculty to the Science Park. By the end of 2010 all the Institutes of the Faculty of Science will be housed at this location and be a part of the prestigious Science Park Amsterdam.

1.3. Academic Reputation

Members of the KdVI had 75 papers in refereed journals, 5 book chapters and 8 professional publications and products in 2009. Under the supervision of staff members of the KdVI 10 PhD theses were completed. There were 15 refereeships in well-known journals.

Top publication:

Meerburg, P.D., Schaar, J.P. van der & Corasaniti, P.S. (2009). Signatures of initial state modifications on bispectrum statistics. *Journal of Cosmology and Astroparticle Physics*, 018.

Peters received a European Reintegration Grant for 4 years (FP 7 Marie Curie).

Van der Geer and Stevenson received funding from “Vrije Competitie NWO EW” for the projects “Modular Forms and Cohomology of Moduli Spaces” (Postdoc, Van der Geer) and “Adaptive wavelet methods for operator equations: tensor product approximations” (AIO, Stevenson).

Homburg and Wiegerinck received from the NDNS+cluster two years half time research funding for the starting UD-position on which Peters was appointed.

Peter van Heijster, part-time PhD student at KdV Institute, and Lotte Hollands received a NWO Rubicon grant.

In December a contract was signed with SURFnet, the provider of the Dutch academic high speed network. Projectleader is Mandjes.

This project will focus on the development of mathematical methods that support design and management of this network, and will extensively rely on novel probabilistic and statistical techniques.

NWO subsidized the STAR-cluster with 1.5 million Euros. Program leader is Mandjes.

De Mast, principal advisor of IBIS, UvA received the Feigenbaum Medal which was handed over to him during the world congress of the American Society for Quality in Minneapolis.

1.4. Scientific evaluations

The full term 6-year scientific evaluation over the period 2003-2008 took place at the end of 2009. The results of the evaluation were published in June 2010.

2. Research

2.1. Algebra, Geometry, and Mathematical Physics

The barycentre of the programme lies in the dynamic area of mathematics where algebra and geometry are in strong interaction.

One part of the dynamics of this area comes from new developments in pure mathematics, the other from developments in mathematical physics, especially string theory, which has supplied a new intuition for developing mathematical ideas. The programme covers a wide area ranging from algebraic and arithmetic geometry, harmonic analysis on algebraic groups and random matrix theory to integrable systems and string theory. Instead of listing the sub disciplines involved, the programme can better be described by two unifying characteristics.

The first is the interplay of algebra and geometry. The second is the fact that many developments in subfields of our theme, such as quantum groups, moduli spaces, non-commutative geometry, were inspired or influenced by recent developments in mathematical physics, while intuition from physics is partially used as a tool to develop mathematics.

Core areas are Algebraic Groups, Algebraic Geometry, Quantum groups. There is a String Theory Group of the University of Amsterdam that is a joint enterprise with the Institute of Theoretical Physics (ITFA).

It receives additional funds from the University Board through the Center of Mathematical Physics Amsterdam (CMPA) and external funding by FOM with the programme String Theory and Quantum Gravity and by NWO with the award of the Spinoza Prize 2003 to prof. dr. R. Dijkgraaf and the VICI grant of dr. K. Skenderis.

Besides this there is Discrete Mathematics in a small but high-quality group.

Highlights

Buryak and Shadrin have found a direct proof of the famous Faber intersection number formula. Opdam was visiting professor at the University of Tokyo during December 2008-January 2009 and also fellow at the Newton Institute (Cambridge, UK) during the month June 2009.

Heinloth was fellow at the Institute for Advanced Study in Princeton (USA) during the autumn 2009.

Together with Faber and Looijenga, Van der Geer has organized a conference (in the famous Texel series): 'Classification of Varieties' at Schiermonnikoog.

Van der Geer and Bergström in joint work with Faber have opened a window on Siegel modular forms of genus 3.

Moonen, in joint work with Polishchuk, has established new relations between the Chow ring of the Jacobian of a curve and the Chow rings of the symmetric powers of the curve.

Highlights String Theory Group

Skenderis and his collaborators obtained several important results in string theory and gauge/gravity duality. Worth mentioning are: real-time holographic methods (JHEP0905:085, 2009), hydrodynamics for non-conformal branes (JHEP0904:062, 2009), topologically massive gravity (JHEP0909:045, 2009).

Skenderis organized a parallel session in the 12th Marcel Grossmann conference in Paris, he was a visiting fellow at KITP in Santa Barbara (USA) and lectured in two international summer schools (Corfu, Milos) and six international conferences and workshops (KITP, Aspen, Paris, Wraslow, McGill, Perimeter).

Van der Schaar, together with his student Meerburg, quantified the non-Gaussian signatures in the Cosmic Microwave Background due to slight modifications in the vacuum state during cosmological inflation. Generically these effects are large and in principle detectable once a more optimal detection strategy is developed, and some first attempts in that direction were also investigated (JCAP 0905:018, 2009).

Dijkgraaf had an important paper on “Toda Theories, Matrix Models, Topological Strings, and $N=2$ Gauge Systems” (with C. Vafa).

Four PhD students graduated from the String Theory Group:

I. Kanitscheider (ITFA, advisor: M. Taylor), I. Messamah (ITFA, advisor: J. de Boer), S. El-Showk (ITFA, advisor: J. de Boer) and L. Hollands (KdVI, advisor: R. Dijkgraaf) and two of them (El-Showk and Hollands) were awarded Rubicon grants.

2.2. Pure, Applied and Numerical Analysis

Analysis is the part of mathematics which uses operations involving infinity, such as limits, convergent infinite series, differentiation and integration. Much of analysis involves functions and function spaces and the study of solutions of many kinds of equations involving functions. Traditionally, the modeling of real world phenomena uses analysis. Although nowadays many other parts of mathematics also contribute to modeling, the interaction between analysis and applications remains very strong, and keeps on vitalizing analysis with fresh ideas. Many new branches of analysis have started by combining analysis with some other part of mathematics. See for instance geometric analysis and dynamical systems, algebraic analysis and q-analysis, stochastic analysis, numerical analysis driven by the need for efficient computer algorithms.

The KdV Institute only specializes in a few of the many parts of analysis. The main current directions are complex analysis and dynamical systems within pure analysis, and numerical analysis and inverse problems within applied analysis. The other topic within pure analysis is special functions and Lie theory, but this has formally ended in 2008 because of retirement of Koornwinder. However, he continues his research as guest of KdVI.

Highlights

Peters (PhD. 2005, Michigan, Ann Arbor) was appointed as UD in the pure analysis group. The appointment is partially funded for two years by a grant from the NDNS+ cluster, obtained by Homburg and Wiegerinck.

Peters also received an EU reintegration grant, allowing him to develop his research for the next four years.

2.2.1. Pure Analysis

In complex analysis (Wiegerinck) the focus is on pluripotential theory, closely related to analytic functions in several complex variables and involving delicate questions of plurifine topology. The internationally important field of complex analysis is nowadays in the Netherlands almost exclusively represented in our group at KdVI.

In dynamical systems (Homburg), bifurcations are an often recurring theme. Other related topics being studied here are stochastic dynamical systems and numerical algorithms for dynamical systems. Nonlinear differential equations are also still an object of study, but a smaller part because of personnel mutations. Our group participates in the countrywide NDNS research cluster (Nonlinear Dynamics of Natural Systems). Although relatively small, the group plays a prominent role in dynamical systems in that cluster.

Both lines of research meet in subject of complex dynamics. Peters, who was in September appointment as UD in the Pure Analysis group, is an expert on this topic.

Highlights

Said El Marzguioui defended his thesis (written under direction of Wiegerinck) in February 2009.

Ramon Driesse defended his thesis (written under direction of Homburg) in November 2009.

2.2.2. Applied and Numerical Analysis

In the numerical analysis group (led by Stevenson) research emphasizes theoretical and rigorous aspects, and heavily leans on functional analysis and wavelet theory. It includes adaptive methods for numerical solution of partial differential equations, also by adaptive

wavelet methods. Another topic is numerically solving high dimensional problems, where the complexity of the method is independent of the dimension. Other work in the group involves finite elements, in particular geometric aspects. Our group is strong in Dutch numerical analysis, certainly in comparison with other general (non-technical) universities.

Hoffmann retired in January.

Highlights

Brandts' paper "On Nonobtuse Simplicial Partitions" with Krizek, Korotov and Solc appeared in SIAM Review with one of its illustrations on the front cover.

Brandts successfully advertized the mathematics behind Google's PageRank to Dutch, Flemish and Czech teachers and adolescents via the journal *De Uitwiskeling*, via teacher's conferences and workshops, and two editions of UvA's Mathematics Web Class.

Brandts was interviewed for Kennislink, and NRC Next.

As a result of Stolk's involvement with the *Study Group Mathematics with Industry* a joint publication appeared in the journal *Physics in Medicine and Biology*.

Stevenson obtained a NWO EW Free Competition grant for a PhD student. As member of the research team of Prof. Schwab (ETH) he benefited from Schwab being awarded an ERC grant, in the sense that he can hire an additional PhD student. Tammo Jan Dijkema, being a PhD student of Stevenson, obtained his doctoral degree at Utrecht University. Stevenson was plenary speaker on the eighth European Conference on Numerical Mathematics and Advanced Applications.

2.3. Stochastics

All phenomena in science and society are ruled by randomness, sometimes partially or to a considerable extent. The branches of mathematics that enable one to understand, predict, and control such phenomena are Probability Theory, Statistics, Stochastic Operations Research, and Financial Mathematics. Collectively they go by the name Stochastics. All said branches are represented within the stochastics programme of the research programme of the Korteweg-de Vries Institute.

Highlights

NWO supports the mathematics cluster 'Stochastics - Theoretical and Applied Research' (STAR), which was founded on May 15, 2009, with a grant of 1.5 million euro for two

years. The stochastics programme of the Korteweg-de Vries Institute participates substantially in this cluster.

2.3.1. Mathematical Statistics

Observing the behaviour of a stochastic system of which the underlying chance mechanism is unknown, one may try to induce which is the true underlying chance mechanism. The mathematics of this problem is called Statistics. Our statistics research covers a wide range from the theoretical to the applied. The programme leader of Mathematical Statistics is Klaassen. Topics are nonparametric and semiparametric statistics, as well as Bayesian statistics. Apart from its intrinsic interest, this research is motivated also by statistical problems in finance, biological psychology, neuroscience, systems biology, and forensic science.

Highlights

Gugushvili (former PhD student, postdoc at Eurandom) and Klaassen have organized the workshop Parameter Estimation for Dynamical Systems at Eurandom.

2.3.2. Industrial Statistics

At the applied side the statistics research on stochastic systems in industry, (financial) service, and healthcare is represented within IBIS UvA under the guidance of Does. Topics are evaluation of measurement systems, control charts, and methodology on Lean Six Sigma. IBIS UvA has been moved to the Faculty of Economics and Business in April 2009, thus closing this subprogramme.

Highlights

De Mast received the *2008 Feigenbaum Medal* of the American Society for Quality (ASQ) for the young person below 36 years who has displayed outstanding characteristics in the field of quality, and Bisgaard received the *2008 Brumbaugh Award* (ASQ) for the paper that made the greatest contribution to the development of industrial applications of quality control.

2.3.3. Probability Theory and Financial Mathematics

Probability Theory studies the behaviour of a stochastic system of which the underlying chance mechanism is known: given this chance mechanism certain system characteristics are analyzed. Probability Theory is rooted in Analysis, more specifically in Measure and Integration Theory, and it nourishes the other branches of Stochastics. Within our programme its research is headed by Mandjes and it has strong links to Stochastic Operations Research as well as Financial Mathematics. Topics are queueing theory, rare-

event analysis, stochastic networks, Lévy processes, and advanced simulation techniques. Besides applications in finance, attention is paid to applications in biology and the medical sciences, as well as in various other domains, including communication networking, and inventory and production systems.

Highlights

A paper of Mandjes has been published in an excellent journal, namely M. Mandjes, I. Norros, and P. Glynn (2009), On convergence to stationarity of fractional Brownian storage, *Annals of Applied Probability* **18**, 1385-1403.

Furthermore, Mandjes has been keynote speaker at the First International Workshop on Traffic Monitoring and Analysis, Aachen, with the lecture Traffic models, and their use in provisioning and traffic management.

Finally, Gugushvili (former PhD student, postdoc at Eurandom), Klaassen, and Spreij have organized the workshop Statistical inference for Lévy Processes with Applications to Finance.

3. Dissemination of Knowledge

3.1. Valorization

3.1.1. IBIS UvA

IBIS UvA is the successful institute for business and industrial statistics. Its activities in research and consultation witness the fact that mathematics and statistics are relevant for society, even so in a commercially very interesting way. Up till April 2009 it was hosted by the KdVI.

3.1.2. PhD Project funded by ABN AMRO.

ABN-AMRO funds a PhD project on “credit risk”. It is carried out by Vincent Leijdekker, under supervision of Spreij. Mandjes will act as promotor.

3.1.2 PhD Project funded by TNO

TNO funded the PhD project on Fluid models for QoS provisioning in communication networks carried out by Frank Roijers. Mandjes acted as his promotor.

3.2. Colloquia

3.2.1. General Mathematics Colloquium

Traditionally the General Mathematics Colloquium takes place on Wednesday mornings. Each academic year, between 20 and 25 lectures are scheduled with speakers from other Dutch (mathematics or mathematics related) institutes or from abroad, as well as from the KdV Institute itself. In particular, guests from abroad who are staying at the KdVI for a shorter or longer period of time are invited to lecture in the colloquium. Furthermore, many defendants of a PhD thesis in mathematics at the UvA also give a lecture in the colloquium shortly before their thesis defense.

The colloquium thus forms an outstanding platform for the lecturers to disseminate new developments to the institute in all branches of mathematics as well as surveys of mathematical methods that are currently en vogue. The organizers are Heinloth, Kleijn and Spreij. The list of past lectures can be found at <http://www.science.uva.nl/research/math/Calendar/colloq/>

3.2.2. The Algebra and Geometry seminar

The Algebra and Geometry seminar is a seminar, sometimes weekly and sometimes more irregularly, organized by Van der Geer devoted to new developments in Algebra and Geometry with also a large emphasis on the education of PhD students. Besides local people, guests from other places give lectures.

3.2.3. The Colloquium Stochastics and Financial Mathematics

The topics of the Colloquium are varying, often depending on the fields of interest of invited speakers. The audience usually consists of researchers of the Korteweg-de Vries institute that are active in Probability and Statistics, but we also often welcome people from other research institutes. In the past years, the Colloquium has been organized on an irregular basis, about 6-8 times per year. The organizer is Spreij.

3.2.4. Numerical Mathematics Colloquium

The Numerical Mathematics Colloquium takes place approximately once a month. The purpose is that researchers at the KdVI get acquainted with research from other institutes. It attempts to follow recent developments in the Dutch Numerical Mathematical community by inviting speakers with recently developed work. The audience consists of approximately 8 to 10 people among researchers from the KdVI and the Centrum voor Wiskunde en Informatica .

3.2.5. Dynamical systems seminar

Peters runs this seminar. The seminar covers topics from dynamical systems, and occasionally topics from (complex) analysis. See:
<http://staf.science.uva.nl/~hpeters/Dynamics.html>

3.2.6. AIO Seminar Mathematics

The aio-seminar was put on hold when we moved to the Science Park. It will be started again in 2010.

3.3. Compositio Mathematica

Compositio Mathematica is a prestigious journal for which Moonen is managing editor. The journal is published by the Foundation Compositio Mathematica in cooperation with the London Mathematical Society. The web page and electronic access to the journal may be found at <http://www.compositio.nl>.

3.4. Thomas Stieltjes Institute for Mathematics

The Thomas Stieltjes Institute for Mathematics is a Dutch inter-university research school. The participants are the relevant departments of the University of Amsterdam (UvA), Free University Amsterdam (VUA), Delft University of Technology (TUD), Technical University Eindhoven (TU/e), Leiden University (UL), and Tilburg University (UvT). The institute collaborates with CWI in Amsterdam and with Eurandom in Eindhoven. Leiden University is secretary of the Institute.

The Stieltjes Institute was founded November 12, 1992, and its research covers four main areas of fundamental and applied mathematics: Algebra and Geometry, Analysis, Stochastics, and Operations Research. The Institute has a training research programme for PhD students and its recognition as a research school ('onderzoeksschool') from the KNAW has been renewed for the period 2004-2010. Further information:
<http://www.stieltjes.org>.

On behalf of the UvA, Klaassen is chairman of the Board of the Stieltjes Institute, Opdam is member of its Science Committee, and Doelman is chairman of its Education Committee. In various research projects within the Stieltjes Institute, researchers from the KdV Institute act as project leaders:

1.2. Geometry (Van der Geer)

2.2. Representation Theory, Operator Algebras and Complex Analysis (Opdam, Wiegerinck)

2.3. Differential Equations, Dynamical Systems and Numerical Analysis (Doelman)

4.1. Discrete Mathematics and Optimization (Schrijver)

4.2. Stochastic Operations Research (Mandjes)

T.1. Theme group Mathematics and Economics (Spreij).

3.5. Alumni

The KdVI is one of the few research institutes in the Faculty of Science that maintains its own alumni network. It started in 1994 with the production of a newsletter that was sent to former students who graduated in 1987 and later. Since then the newsletter has appeared twice a year, and its circulation number now reaches 400. It contains articles contributed by alumni and members of the staff of the KdVI. Van Es is editor. Due to logistic problems, the newsletter did not appear in 2009.

3.6. Mathematics and society

For the seventh consecutive year, KdVI, jointly with ILLC, organized a public relations day *Leve de Wiskunde!* It was held on April 24, and was aimed at high school math teachers, who were also invited to bring along a few of their interested pupils. From KdVI, Mandjes, Brandts, Heinloth and Zaal were active in the organization; the ILLC was represented by Terwijn. There were over 60 participants. Grünwald (CWI), Stokman (KdVI), De Vilder (KdVI), and Sloot (IvI) gave lectures. De Wiljes and Nienhuis gave information about the scientific and social activities of De Wiskundeclub, the student club of the KdVI. A new initiative was the panel discussion with the audience about themes of cooperation between high schools and UvA.

Koornwinder is a member of the organizing committee of the International Mathematical Olympiad 2011, which will be held in Amsterdam in July 2011. Dijkgraaf is chairman of the foundation IMO2011.

Van de Craats, Koornwinder and Zaal are members of the ‘Taakgroep Landelijke Wiskunde-PR’, a joint committee of Koninklijk Wiskundig Genootschap (KWG) and Nederlandse Vereniging van Wiskundeleraren.

This committee supervises the work of the ‘Landelijk PR-medewerker Wiskunde’ (the national public relations officer for mathematics) and the ‘vakredacteur wiskunde’ of Kennislink (www.kennislink.nl), a website aiming at disseminating new developments in science to the general Dutch audience, in particular high school students. Van de Craats also chairs the advisory board of Kennislink, and Koornwinder is a member of its editorial board.

We have become used to Dijkgraaf's many outreach activities in the form of public lectures, popular articles and media presentations. Perhaps these are natural activities for a university professor, yet the importance for the KdVI and mathematics in general cannot be overestimated. Dijkgraaf wrote numerous columns for NRC Handelsblad and Folia. Since May 2008 Dijkgraaf is President of the KNAW.

The project 'DisWis', set up by 'De Praktijk' (an institute for scientific education) and subsidized by prof. dr. Schrijver's Spinoza project, has developed a course in discrete mathematics and optimization, to be taught by university students at high schools. The goal is to bring the high school pupils in contact with discrete mathematics as an interesting, challenging and applicable branch of mathematics, and to inform them about the contents and prospects of studying mathematics, by direct interaction with students. After test runs in the school year 2006-2007, the project started in the school year 2007-2008. The programme has become successful and there is a substantial increase of the number of schools and students involved.

Mandjes gave a lecture for children at NEMO in the series "Wakker worden kinderlezingen" titled "Waarom win ik nooit de loterij?" This lecture was also given at the 'Open Dag Sciencepark 2009'.

The KdV Institute is co-sponsor Pythagoras, a mathematics youth magazine. Zaal is publisher of Pythagoras on behalf of the Koninklijk Wiskundig Genootschap.

Zaal coordinates in a project of the Taakgroep Nationale Wiskunde PR called 'Wiskunde in Perspectief'. Its goal is to communicate nationwide the career possibilities for people with a math degree.

4. Management

4.1. Finance

	2009	
	kEURO	%
Direct funding	2356	59%
Research funds	557	14%
Contracts	177	4%
Other	931	23%
Total	4021	100%
Personnel costs	2468	69%
Other costs	1091	31%
Total	3558	100%
Resultaat	463	

Please note that the amount for Direct funding includes matching to cover overhead costs in NWO and EU projects. The reason for this is that the UvA works with the fullcost model, and that organizations like NWO only reimburse salary costs.

4.2. Human resources

In 2009, the average formation of the institute (i.e. members of staff employed by the University of Amsterdam) is as follows when calculated in fte (full time equivalent):

Appointment	Professor	Assoc. Prof.	Assist. Prof.	Postdoc	Lecturer	PhD student	Support	Total
Tenured staff	6.5	6.5	5.3		0.7		1.3	20.3
Non-tenured staff	0.3	0.2	1.0	4.9	0.5	10.4	0.4	17.7
Professor by special appointment	0.2							0.2
Secondment					0.1	0.5		0.6
Guest	1.9	0.7	0.8	1.1	0.4	4.6		9.5
Total	8.9	7.4	7.1	6.0	1.7	15.5	1.7	48.3

Apart from people employed by the University, the institute welcomes a steady stream of visitors, who come to work here for shorter or longer periods of time.

In the table below the formation (including long-term visitors) is translated into research input, distributed over the various research programs. On average, the research input is related to the human resources input in the following way: regular staff spend 50% of their time on research, postdocs/fellows spend 90%, and PhD students spend 75% of their time on research. G-1, G-2, and G-3 stands for Direct, Indirect, and External funding respectively (see also appendices 3, 4, and 5), while G-4 stands for long-term visitors.

Research program	G-1	G-2	G-3	G-4	Total
Algebra and Geometry	2.35	3.95		0.35	6.65
Mathematical Physics	1.20	2.35		0.00	3.55
Discrete Mathematics	0.10	0.20			0.30
Pure Analysis	0.30	0.25		0.55	1.10
Applied and Numerical Analysis	3.35	2.40		0.95	6.70
Stochastics	3.20	0.75	0.65	3.05	7.65
Didactics				0.10	0.10
Total	10.50	9.90	0.65	5.00	26.05

4.3. Facilities

4.3.1. Housing

In May 2009 the KdV Institute moved from the centre of Amsterdam to the Faculty of Science at the Science Park Amsterdam. The Science Park Amsterdam is also the home of internationally renowned research institutes like the National Institute for Subatomic Physics (NIKHEF), the Institute for Atomic and Molecular Physics (AMOLF), the National Research Institute for Mathematics and Computer Science (CWI), as well as SARA Computing and Networking Services. The park also houses more than 80 innovative companies.

4.3.2. Library

The mathematics library of the University of Amsterdam is of vital importance for the research and educational activities of the KdV Institute. In mathematics, quite different from many other sciences, the older literature remains important.

In 2009 the mathematics library, part of the 'Library Mathematics and Computer Science', moved to the Science Park. It became an integrated part of the Faculty of Science Library, which, in its turn, is part of the Library of the University of Amsterdam.

Organizationally, the Library of the Faculty of Science is part of the ‘Scientific Information Services’ (WID) of the Faculty of Science, headed by Drs G.H.J. Kohler. The library budget is determined by the Dean, rather than by the KdV Institute or by the Central University Library. It is no longer possible to make precise the budgets for journals and for books exclusively for mathematics. Mathematics journals are financially pooled with those for physics and astronomy.

In 2008 Van der Geer succeeded Koornwinder as a representative on the library council of the Faculty of Science. His membership of this council also involves preparing decisions about journal subscriptions and book purchases within the available budget. A crucial tool for searching the mathematics literature are MathSciNet and, to a lesser extent, Zentralblatt MATH; the library provides online access to both.

4.4. Communication

The institute has a homepage <http://www.science.uva.nl/math>. Its aim is to reach visitors from outside the KdV Institute, and less so the KdVI members themselves. In particular, outreach activities and news about staff members and students are prominent. In 2008 the design of the homepage changed into a new format and system. Weekly new information on the KdVI website will automatically be sent to the staff as well.

Communication between management and members of staff takes place on different levels.

The director discusses on a regularly base managerial matters with the executive board (‘dagelijks bestuur’), i.e. with Mandjes and Opdam. Full time and part time professors get together approximately every month to discuss ongoing policy matters. Once a year a formal meeting is held for tenured staff.

On an informal base each research group has its own group meetings.

Appendix 1. People in the Research Programs

People In The Research Programs

ALGEBRA AND GEOMETRY

Program Leader: Prof. dr. G.B.M. van der Geer

· *Algebraic Geometry:*

Prof. dr. G.B.M. Van der Geer

Dr. B.J.J. Moonen

Dr. O.L.J. Bergström (until 09-2009)

Drs. R. Salomon

Drs. P.M.J. Joris (until 12-2009)

Drs. M. Hoeve

· *Algebraic Groups:*

Prof. dr. E.M. Opdam

Dr. J.V. Stokman

Dr. Heinloth

Dr. G.F. Helminck

Dr. J. Hartwig (until 09-2009)

Dr. S.C.J. Kolb (from 09-2009)

Drs. M. van Meer

Drs. R.I. van der Veen

Retired faculty / professors emeriti:

Dr. R.W. van der Waall

MATHEMATICAL PHYSICS

Program Leader: Prof. dr. R.H. Dijkgraaf

Geometric Methods in Physics:

Dr. S. Shadrin

Dr. H.B. Posthuma

Drs. A.Y. Buryak (from 08-2009)

Dr. Ö. Ceyhan (from 08-2009)

Prof. dr. N.Y. Reshetikhin

• ***String Theory (jointly with ITFA):***

The list of ITFA PhD's and post docs in the group String Theory, is based to the agreement between ITFA and KdVI.

For a full list of the staff members ITFA the annual report of the ITFA should be consulted.

Prof. dr. R.H. Dijkgraaf
Dr. K. Skenderis (ITFA/KdVI)
Prof. dr. J. de Boer (ITFA)
Dr. M. Taylor (ITFA)
Prof. dr. E.P. Verlinde (ITFA)
Dr. J.P. van der Schaar (KdVI)
Dr. T. Quella (ITFA; KdVI from 09/2009)
Drs. A.W. Bzowski (from 09-2009)
Drs. L. Hollands (ITFA/KdV until 09/2009)
Drs. K. Hoogeveen (ITFA/KdV)
Drs. P.D. Meerburg (ITFA, KdV, API)
Drs. J.M. Oberreuter (ITFA/KdV)
Drs. B.C. van Rees (ITFA/KdV)
Drs. J. Smolic (ITFA)
Drs. M. Smolic (ITFA)

DISCRETE MATHEMATICS

Program Leader: Prof. dr. A. Schrijver

Prof. dr. A. Schrijver
Dr. D.C. Gijswijt (until 04-2009)

PURE, APPLIED AND NUMERIC ANALYSIS

Program Leader: Prof. dr. J.J.O.O. Wiegerinck

• ***Complex Analysis and Dynamical Systems:***

Prof. dr. J.J.O.O. Wiegerinck
Dr. A.J. Homburg
Prof. dr. A. Doelman (until 02-2009)
Dr. R.G. de Vilder
Dr. H. Peters (from 09-2009)
Dr. A. Zagaris (until 09-2009)
Drs. R. Driesse (until 06-2009)
Drs. P.J.A. van Heijster (until 07-2009)
Drs. S. van der Stelt

Retired faculty / professors emeriti:

Prof. dr. J. Korevaar
Prof. dr. T.H. Koornwinder
Dr. E. Hendriksen

Applied and Numerical Analysis

Prof. dr. Stevenson
Prof. dr. J.G. Verwer
Dr. J.H. Brandts
Dr. C.C. Stolk
Dr. S.K. Bhowmik
Drs. R.J. Reis da Silva
Drs. T.J. Dijkema (until 07-2009)
Drs. T.J. Op 't Root
Drs. N. Godarzvand Chegini (from 06-2009)

Retired faculty / professors emeriti:

Prof. dr. P.W. Hemker
Dr. W. Hoffmann

STOCHASTICS

Program Leader: Prof. dr. C.A.J. Klaassen

• Mathematical Statistics:

Prof. dr. C.A.J. Klaassen
Dr. A.J. van Es
Dr. B.J.K. Kleijn
Dr. A.J. Lenstra
Dr. S. Gugushvili
Drs. E. Veerman
Drs. C.E. Schapers
D.H. Baillie, M.Sc. (from 04-2009)

• Industrial Statistics:

Prof. R.J.M.M. Does (until 04-2009)
Dr. J. de Mast (until 04-2009)
Drs. B.P.H. Kemper (until 04-2009)
Drs. M. Schoonhoven (until 04-2009)
Prof. dr. S. Bisgaard (until 04-2009)

• Probability Theory:

Prof. dr. M.R.H. Mandjes
Dr. P.J.C. Spreij
Drs. A. Es-Saghouani
Drs. F. Roijers (until 03-2009)
Drs. J. Ivanovs
Drs. K.M. Kosiński
Drs. P.W. Zuraniewski (from 01-2009)

Retired faculty / professors emeriti:

Dr. A.A. Balkema

Prof. dr. A.N. Shiryaev

Prof. dr. M.S. Keane

SPECIAL THEME

· *Financial Mathematics:*

Dr. R.G. de Vilder

Dr. P.J.C. Spreij

Drs. M.P. Visser

Drs. V.J.G. Leijdekker

Dr. A.A. Balkema

Prof. dr. C.A.J. Klaassen

Prof. dr. A.N. Shiryaev

OTHER RESEARCH

Program Leader: Prof. dr. J. van der Craats

· *Didactics:*

Prof. dr. J. van der Craats

Drs. A.J.P. Heck

Appendix 2. Research output (table)

Table Research output – aggregated results of the institute

1. Academic publications	a. refereed journals	75
	b. other journals	0
	c. book chapters	8
Total		87
2. Monographs		0
3. PhD theses		10
4. Professional publications and products		8

Table Research output – Programme Algebra, Geometry and Mathematical Physics

1. Academic publications	a. refereed journals	25
	b. other journals	0
	c. book chapters	1
Total		26
2. Monographs		0
3. PhD theses		3
4. Professional publications and products		1

Table Research output – Programme Analysis

1. Academic publications	a. refereed journals	27
	b. other journals	0
	c. book chapters	4
Total		31
2. Monographs		0
3. PhD theses		4
4. Professional publications and products		1

Table Research output – Programme Stochastics

1. Academic publications	a. refereed journals	23
	b. other journals	0
	c. book chapters	3
Total		30
2. Monographs		0
3. PhD theses		3
4. Professional publications and products		1

Appendix 3. List of Publications 2009

Scientific publications: articles in journals, proceedings and edited books; monographs. These are always refereed.

Other publications: book editor or professional or popularizing publication.

PhD theses: result of PhD research done by a PhD student under supervision of a member of KdV Institute; the student may or may not be an employee of the University of Amsterdam, and the thesis was either prepared inside or outside this university.

Theses can be downloaded from the KdVI website:

<http://www.science.uva.nl/math/Research/dissertations.php>

Preprints and reports: not included here; see

<http://www.science.uva.nl/math/research.cfm> .

Author names in bold have or had an affiliation with the KdV Institute while research for the publication was done or while the publication appeared.

Mathematical publications: Documentation and review for most papers can be electronically obtained from MathSciNet at <http://www.ams.org/mathscinet> (not a free service).

Note: In the current report a few publications of the previous report year may have been included, which were not included in the previous annual report.

uva/nwi/kvi/1.1 - Algebra and Geometry

scientific article - letter to the editor

Bergstrom, O.L.J. (2009). Equivariant counts of points of the moduli spaces of pointed hyperelliptic curves. *Documenta mathematica*, 14, 259-296.

Heinloth, J. & Schröer, S. (2009). The bigger Brauer group and twisted sheaves. *Journal of Algebra*, 322(4), 1187-1195.

Kolb, S.C.J. & **Stokman, J.V.** (2009). Reflection equation algebras, coideal subalgebras, and their centres. *Selecta Math. (N.S.)*, 15(4), 621-664.

Moonen, B.J.J. (2009). Relations between tautological cycles on Jacobians. *Commentarii Mathematici Helvetici*, 84(3), 471-502.

Opdam, E.M. & **Solleveld, M.S.** (2009). Homological algebra for affine Hecke algebras. *Advances in Mathematics*, 220(5), 1549-1601.

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Veen, R.I. van der (2009). The volume conjecture for augmented knotted trivalent. *Algebraic & Geometric Topology*, 9(2), 691-722.

scientific article in volume - proceedings

Emsiz, E., Opdam, E.M. & Stokman, J.V. (2009). Trigonometric Cherednik algebra at critical level and quantum many-body problems. In K. Baur, V. Ginzburg, I. Gordon, A. Parker & C. Stroppel (Eds.), *Selecta Mathematica 14, 3-4 Vol. 14. Selecta Math. (N.S.)* (pp. 571-605). Basel: Birkhauser Verlag AG.

Geer, G.B.M. van der (2009). Hunting for curves with many points. In *Proceedings IWCC Vol. 5557. Lecture Notes in Computer Science* (pp. 82-96).

Geer, G.B.M. van der (2009). The limit of the Fourier-Mukai transform. In *Complex Algebraic Geometry, report no. 44 Vol. 44. Oberwolfach Reports* (pp. 17-19). Zürich, Switzerland: European Mathematical Society.

part of book - chapter – scientific publication

Ekedahl, T. & **Geer, G.B.M. van der** (2009). Cycle classes of the E-O stratification on the moduli of abelian varieties. In Y. Tschinkel & Y. Zarhin (Eds.), *Algebra, arithmetic, and geometry: In honor of Yu. I. Manin: Volume I* (Progress in mathematics, 269), 567-636. Boston: Birkhäuser.

journal editorship - referee

Moonen, B.J.J. (Ed.). (2009). *Compositio Mathematica*.

article – professional publication

Waal, R.W. van der & Clerck, L. de (2009). Antwoorden Doeboek 21. *Vierkant voor Wiskunde*, Doeboek 21.

part of book - chapter – popularizing publication

Waal, R.W. van der (2009). Wiskunde. In D. Kohnstamm, J. van Everdingen & I. Rümke (Eds.), *Cultureel Woordenboek*.

uva/nwi/kvi/1.2 - Mathematical Physics

scientific article - letter to the editor

Berkovits, N., Hoogeveen, J. & **Skenderis, K.** (2009). Decoupling of unphysical states in the minimal pure spinor formalism II. *Journal of High Energy Physics*, 0909(035).

Dijkgraaf, R., Orlando, D. & Reffert, S. (2009). Quantum crystals and spin chains. *Nuclear Physics B*, 811(3), 463-490.

Dijkgraaf, R.H. (2009). D-Branes and D-Modules. *Progress of Theoretical Physics Supplement*, 177, 12-32.

Geer, N. & **Reshetikhin, N.Y.** (2009). On Invariants of Graphs Related to Quantum $sl(2)$ at Roots of Unity. *Letters in Mathematical Physics*, 88(1-3), 321-331.

Kanitscheider, I.R.G. & **Skenderis, K.** (2009). Universal hydrodynamics of non-conformal branes. *Journal of High Energy Physics*, 0904(062).

Markl, M., Merkulov, S. & **Shadrin, S.** (2009). Wheeled PROPs, graph complexes and the master equation. *Journal of Pure and Applied Algebra*, 213(4), 496-535.

Meerburg, P.D., **Schaar, J.P. van der** & Corasaniti, P.S. (2009). Signatures of initial state modifications on bispectrum statistics. *Journal of Cosmology and Astroparticle Physics*, 05, 018.

Pflaum, M.J., **Posthuma, H.** & Tang, X. (2009). On the algebraic index for Riemannian étale groupoids. *Letters in Mathematical Physics*, 90(1-3), 287-310.

Shadrin, S. (2009). BCOV theory via Givental group action on cohomological field theories. *Moscow Mathematical Journal*, 9(2), 411-429.

Shadrin, S. (2009). On the structure of Goulden-Jackson-Vakil formula. *Math. Res. Lett.*, 16(4), 703-710.

Skenderis, K. & Rees, B.C. van (2009). Realtime gauge/gravity duality: Prescription, Renormalization and Examples. *Journal of High Energy Physics*, 0905(085).

Skenderis, K., Taylor, M.M. & Rees, B.C. van (2009). Topologically Massive Gravity and the AdS/CFT Correspondence. *Journal of High Energy Physics*, 0909(045).

PhD thesis

Hollands, L. (2009, September 3). *Topological strings and quantum curves*. UvA Universiteit van Amsterdam (300 pag.). Prom./coprom.: **prof.dr. R.H. Dijkgraaf**.

journal editorship - referee

Reshetikhin, N.Y. (Ed.). (2009). *Advances in Theoretical and Mathematical Physics*.

Reshetikhin, N.Y. (Ed.). (2009). *Letters in Mathematical Physics*.

Reshetikhin, N.Y. (Ed.). (2009). *Representation Theory*.

uva/nwi/kvi/1.3 - Discrete Mathematics

scientific article - letter to the editor

Kroon, L.G., Huisman, D., Abbink, E., Fioole, P.J., Fischetti, M., Maróti, G., **Schrijver, A.** & Steenbeek, A. (2009). The OR revolution. *Interfaces*, 39, 6-17.

– **Lovász, L.** & **Schrijver, A.** (2009). Semidefinite functions on categories.

The Electronic Journal of Combinatorics, 16(2), R14.

Schrijver, A. (2009). Graph invariants in the spin model. *Journal of Combinatorial Theory. Series B*, 99(2), 502-511.

PhD thesis

Leeuwen, E.J. van (2009, June 16). *Optimization and approximation on systems of geometric objects*. UvA Universiteit van Amsterdam. Prom./coprom.: **prof.dr. A. Schrijver**.

Oliveira Filho, F.M. de (2009, December 1). *New bounds for geometric packing and coloring via harmonic analysis and optimization*. UvA Universiteit van Amsterdam. Prom./coprom.: **prof.dr. A. Schrijver** & dr. F. Vallentin.

uva/nwi/kvi/2.1 – Complex Analysis and Dynamical Systems

scientific article - letter to the editor

Atakishiyeva, M.K., Atakishiyev, N.M. & **Koornwinder, T.H.** (2009). On a q-extension of Mehta's eigenvectors of the finite Fourier transform for q, a root of unity, *Journal of Physics. A, mathematical and general*, 42(454004).

Doelman, A., Heijster, P.J.A. van & Kaper, T.J. (2009). Pulse Dynamics in a Three-Component System: Existence Analysis. *Journal of dynamics and differential equations*, 21(1), 73-115.

Driesse, R. & Homburg, A.J. (2009). Essentially asymptotically stable homoclinic networks. *Dynamical Systems*, 24(4), 459-471.

Driesse, R. & Homburg, A.J. (2009). Resonance bifurcation from homoclinic cycles. *Journal of Differential Equations*, 246(7), 2681-2705.

— **Härdin, H.M., Zagaris, A., Krab, K. & Westerhoff, H.V.** (2009). Simplified yet highly accurate enzyme kinetics for cases of low substrate concentrations. *FEBS Journal*, 276(19), 5491-5506.

Koornwinder, T.H. (2009). The Askey scheme as a four-manifold with corners. *The Ramanujan Journal*, 20(3), 409-439.

Korevaar, J. (2009). Prime pairs and the zeta function. *Journal of Approximation Theory*, 158(1), 69-96.

Zagaris, A., Gear, C.W., Kaper, T.J. & Kevrekidis, Y.G. (2009). Analysis of the accuracy and convergence of equation-free projection to a slow manifold. *Mathematical Modelling and Numerical Analysis (ESAIM - M2AN)*, 43(4), 757-784.

Zagaris, A., Doelman, A., Pham Thi, N.N. & Sommeijer, B.P. (2009). Blooming in a non-local, coupled phytoplankton-nutrient model. *SIAM Journal on Applied Mathematics*. 69(4), 1174-1204.

scientific article in volume - proceedings

El Marzguioui, S. & Wiegerinck, J. (2009). Connectedness in the pluri-fine topology. In A. Aytuna, R. Meise, T. Terzioğlu & D. Vogt (Eds.), *Functional analysis and complex analysis: Functional Analysis and Complex Analysis, September 17-21, 2007, Sabanci University, Istanbul, Turkey Contemporary Mathematics* (pp. 105-116). Providence, RI, USA: American Mathematical Society.

PhD thesis

Driese, R. (2009, November 10). *Bifurcations from robust homoclinic cycles*. UvA Universiteit van Amsterdam. Prom./coprom.: **prof.dr. A. Doelman & dr. A.J. Homburg.**

El Marzguioui, S. (2009, February 18). *Fine Aspects of Pluripotential Theory*. UvA Universiteit van Amsterdam. Prom./coprom.: **prof.dr. J.J.O.O. Wiegerinck.**

Heijster, P.J.A. van (2009, May 26). *Front interactions in a three-component system*. UvA Universiteit van Amsterdam. Prom./coprom.: **prof.dr. A. Doelman.**

journal editorship - referee

Koornwinder, T.H. (Ed.). (2008). *Advances in Pure and Applied Mathematics*.

Koornwinder, T.H. (Ed.). (2009). *Constructive Approximation*.

Koornwinder, T.H. (Ed.). (2006). *Journal of nonlinear mathematical physics*.

Koornwinder, T.H. (Ed.). (2009). *SIGMA*.

uva/nwi/kvi/2.2 - Applied and Numerical Analysis

scientific article - letter to the editor

Bergen, B. van den, **Stolk, C.C.**, Berg, J.B. van den, Lagendijk, J.J.W. & Berg, C.A.T. van den (2009). Ultra fast electromagnetic field computations for RF multi-transmit techniques in high field MRI. *Physics in Medicine & Biology* 54(5), 1253-1264.

Bhowmik, S.K. (2009). Nonstandard Numerical Integrations of A Lotka-Volterra System. *International Journal of Open Problems in Computer Science and Mathematics*, 2(2), 332-341.

Bhowmik, S.K. (2009). Numerical Computation of a Nonlocal Double Obstacle Problem. *International Journal of Open Problems in Computer Science and Mathematics*, 2(1), 19-36.

- Botchev, M.A. & Verwer, J.G. (2009). Numerical integration of damped Maxwell equations. *SIAM Journal on Scientific Computing*, 31(2), 1322-1346.
- Brandts, J., Korotov, S., Křížek, M. & Šolc, J. (2009). On nonobtuse simplicial partitions. *Siam Review*, 51(2), 317-335.
- Brandts, J., Korotov, S. & Křížek, M. (2009). On the equivalence of ball conditions for simplicial finite elements in R-d. *Applied Mathematics Letters*, 22(8), 1210-1212.
- Brandts, J.H. (2009). Analysis of a non-standard mixed finite element method with applications to superconvergence. *Applications of Mathematics*, 54(3), 225-235.
- Dijkema, T.J., Schwab, C. & Stevenson, R. (2009). An adaptive wavelet method for solving high-dimensional elliptic PDEs. *Constructive Approximation*, 30(3), 423-455.
- Huyghe, J.M., Wilson, W. & Malakpoor, K. (2009). On the Thermodynamical Admissibility of the Triphasic Theory of Charged Hydrated Tissues. *Journal of Biomechanical Engineering – Transactions of the ASME*, 131(4).
- Malakpoor, K. & Huyghe, J.M. (2009). An Analytical Solution of Compressible Charged Porous Media. *ZAMM (Zeitschrift für Angewandte Mathematik und Mechanik)*, 89(9), 742-753.
- Mommer, M.S. & Stevenson, R. (2009). A goal-oriented adaptive finite element method with convergence rates. *SIAM Journal on Numerical Analysis*, 47(2), 861-868.
- Nguyen, H. & Stevenson, R. (2009). Finite element wavelets with improved quantitative properties. *Journal of Computational and Applied Mathematics*, 230(2), 706-727.
- Schwab, C. & Stevenson, R. (2009). Space-time adaptive wavelet methods for parabolic evolution problems. *Mathematics of Computation*, 78(267), 1293-1318.
- Stevenson, R. & Werner, M. (2009). A multiplicative Schwarz adaptive wavelet method for elliptic boundary value problems. *Mathematics of Computation*, 78(266), 619-644.
- Stolk, C.C. (2009). A fast method for linear waves based on geometrical optics. *SIAM Journal on Numerical Analysis*, 47(2), 1168-1194.
- Stolk, C.C., Hoop, M.V. de & Symes, W.W. (2009). Kinematics of shot-geophone migration. *Geophysics*, 74(6), WCA19-WCA34.

Verwer, J.G. (2009). Runge-Kutta methods and viscous wave equations. *Numerische Mathematik*, 112(3), 485-507.

Verwer, J.G. & Botchev, M.A. (2009). Unconditionally stable integration of Maxwell's equations. *Linear Algebra and its Applications*, 431, 300-317.

scientific article in volume - proceedings

Ambati, V.R., Asheim, A., Berg, J.B. van den, Gennip, Y. van, Gerasimov, T., Hlod, A., Planqué, B., Schans, M. van der, **Stelt, S. van der**, Vargas Rivera, M. & Vondenhoff, E. (2008). Some studies on the deformation of the membrane in an RF MEMS switch. In O. Bokhove, J. Hurink, G. Meinsma, **C. Stolk** & M. Vellekoop (Eds.), *Proceedings of the sixty-third European Study Group Mathematics with Industry: Enschede, the Netherlands, 28 January - 1 February, 2008* (pp. 65-84). Amsterdam: Centrum voor Wiskunde en Informatica.

Archer, C., Hochstenbach, M., Hoede, K., Meinsma, G., Meijer, H., Salah, A.A., **Stolk, C.C.**, Swist, T. & Zyprych, J. (2009). Neural spike sorting with spatio-temporal features. In O. Bokhove, J. Hurink, G. Meinsma, C. Stolk & M. Vellekoop (Eds.), *Proceedings of the sixty-third European Study Group Mathematics with Industry: Enschede, The Netherlands, 28 January–1 February, 2008* (pp. 21-45). Enschede, the Netherlands: Universiteit Twente.

part of book - chapter

Stevenson, R. (2009). Adaptive wavelet methods for solving operator equations: An overview. In R.A. DeVore & A. Kunoth (Eds.), *Multiscale, nonlinear and adaptive approximation: Dedicated to Wolfgang Dahmen on the occasion of his 60th birthday* (pp. 543-597). Berlin: Springer.

PhD thesis

Ashyraliyev, M. (2009, October 20). *Modelling, simulation, and inferring regulatory networks*. UvA Universiteit van Amsterdam. Prom./coprom.: **prof.dr. J.G. Verwer**.

book editorship

Bokhove, O., Hurink, H., Meinsma, G., **Stolk, C.** & Vellekoop, M. (Eds.). (2009). *Proceedings of the sixty-third European Study Group Mathematics with Industry: Enschede, The Netherlands, 28 January–1 February, 2008*. Enschede, the Netherlands: Universiteit Twente.

lecture

Stevenson, R.P. (2009, June 29). *Adaptive wavelet methods for solving operator equations: An overview*. Uppsala University, Sweden, ENUMATH 2009 - The eighth European Conference on Numerical Mathematics and Advanced Applications.

Verwer, J.G. (2009, September 14). *Time integration of Maxwell's equations*. Halle, Germany, Invited plenary lecture at NUMDIFF12 on Numerical Solution of Differential and Differential-Algebraic Equations.

journal editorship - referee

Brandts, J.H. (Ed.). (2009). *Applications of Mathematics*.

Brandts, J.H. (Ed.). (2009). *SIAM Journal on Matrix Analysis and Applications*.

Verwer, J.G. (Ed.). (2009). *ACM Transactions on Mathematical Software (TOMS)*.

Verwer, J.G. (Ed.). (2009). *Advances in Numerical Analysis, 2009*.

book review – professional publication

Brandts, J. (2009). [Book review *Matrix computations and semiseparable matrices. Vol. 1: Linear systems*]. *Applications of Mathematics*, 54(3), 296-296.

uva/nwi/kvi/03 - Stochastics

scientific article - letter to the editor

Adan, I.J.B.F., **Mandjes, M.R.H.**, Scheinhardt, W. & Tzenova, E.I. (2009). On a generic class of two-node queueing systems. *Queueing Systems*, 61(1), 37-63.

Andersen, L.N. & **Mandjes, M.R.H.** (2009). Structural properties of reflected Lévy processes. *Queueing Systems*, 63(1-4), 301-322.

Ayesta, U. & **Mandjes, M.R.H.** (2009). Bandwidth-sharing networks under a diffusion scaling. *Annals of Operations Research*, 170(1), 41-58.

Bekker, R., and **Mandjes, M.R.H.** (2009). A fluid model for a relay node in an ad-hoc network: the case of heavy-tailed input. *Mathematical Methods in Operations Research*, Vol. 70, pp. 357-384.

Debicki, K., **Es-Saghouani, A.** & **Mandjes, M.R.H.** (2009). Transient characteristics of Gaussian queues. *Queueing Systems*, 62(4), 383-409.

Dieker, T. and **Mandjes, M.R.H.** (2009). Extremes of Markov-additive processes with one-sided jumps, with queueing applications. *Methodology and Computing in Applied Probability*. Available online.

Does, R.J.M.M., Vermaat, T.M.B., Verver, J.P.S., Bisgaard, S. & Heuvel, J. van den (2009). Reducing start time delays in operating rooms. *Journal of Quality Technology*, 41(1), 95-109.

Es-Saghouani, A. and Mandjes, M.R.H. (2009). On the correlation structure of a Lévy-driven queue. *Journal of Applied Probability*, Vol. 45, pp. 940-952.

Es-Saghouani, A. & Mandjes, M.R.H. (2009). On the Dependence Structure of Gaussian Queues. *Stochastic Models*, 25(2), 221-247.

Es-Saghouani, A. and Mandjes, M.R.H. (2009). Transient analysis of Markov fluid driven queues. TOP – *Journal of the Spanish Society of Statistics and Operations Research*. Available online.

Göbel, J., Krzesinski, A. and **Mandjes, M.R.H.** (2009). Incentive-based control of ad-hoc networks: a performance study. *Computer Networks*, Vol. 53, pp. 2427-2443.

Gonchigdanzan, K. & **Kosiński, K.M.** (2009). On the functional limits for partial sums under stable law. *Statistics and Probability Letters*, 79(17), 1818-1822.

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