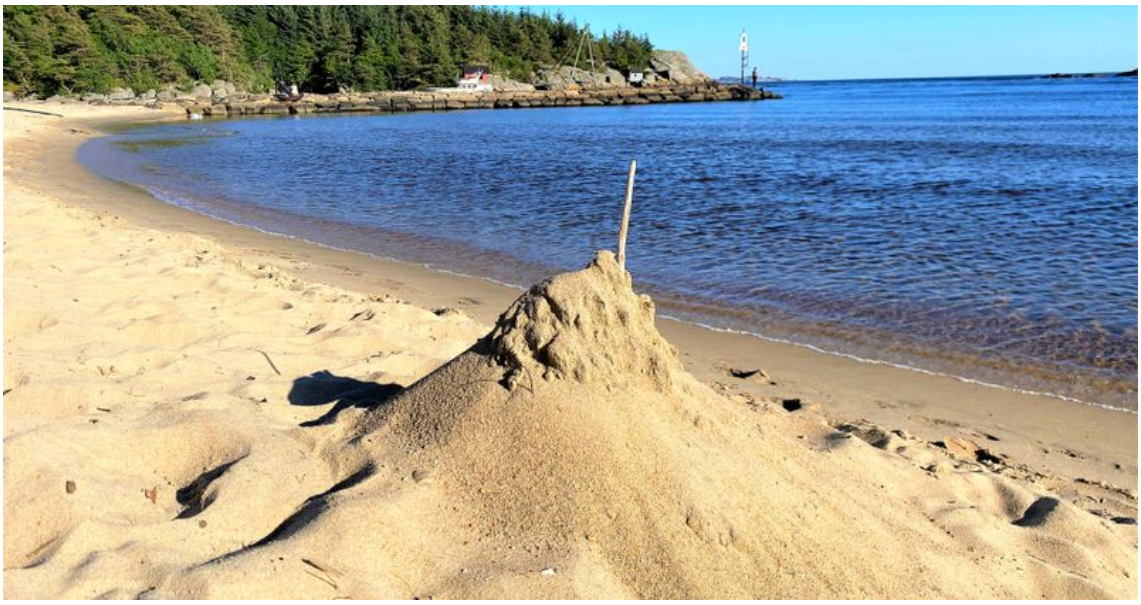
INFOMAT

JUNI 2020



INFOMAT ønsker alle lesere og medlemmer av foreningen en god sommer, med håp om en mer normalisert høst.

INFOMAT kommer ut med 11 nummer i året og gis ut av Norsk Matematisk Forening. Deadline for neste utgave er alltid den 15. i neste måned. Stoff til INFOMAT sendes til

arnebs at math.uio.no

Foreningen har hjemmeside http://www.matematikkforeningen.no/
Ansvarlig redaktør er Arne B. Sletsjøe, Universitetet i Oslo

Matematisk kalender

På grunn av den pågående situasjonen mht koronaviruset kan flere av arrangementene bli utsatt eller avlyst. Følg med på web-sidene.

Juni:
2.-6. Sommerskole: ***Mathematics and Data***, Tromsø [UTSATT TIL HØSTEN 2020] <https://mathdat.puremath.no/>
22.-26. Sommerskole:Topics in real algebraic geometry, Nordfjordeid [AVLYST] <https://www.mn.uio.no/math/english/about/collaboration/nordfjordeid/conferences/real-alg-geo-2020/>
25.-30. 10th International Conference on Mathematical Methods for Curves and Surfaces, Oslo [UTSATT TIL 28. JUNI-2.JULI 2021] <www.mn.uio.no/MMCS10>

September:
3.-4. Nasjonalt matematikermøte, Trondheim [UTSATT TIL SOMMEREN 2021] <https://www.ntnu.no/imf/matematikermote>
28.-29. Mathematics without Borders, IMU 100 år, Strasbourg

November/desember:
30.-4. Vinterskole: ***Geometry and analysis of quantum groups***, Oslo <https://www.mn.uio.no/math/english/research/groups/operator-algebras/events/conferences/ge-anqg-2020/index.html>

NYTT OM NASJONALT MATEMATIKERMøTE 2020

Det nasjonale matematikermøtet 2020 er utsatt til sommeren 2021.

Nye doktorgrader

Oussama Amine ved UiO forsvarte 17. juni 2020 sin avhandling *Regularization Effects for Certain Dynamical Systems through Gaussian Noises* for graden PhD.
Veiledere har vært Professor Frank Norbert Proske, Professor Arne Huseby, Professor Fred Espen Benth, Professor Bernt Øksendal, alle UiO, Associate Professor Abdol-Reza Mansouri, Queen's University.

Sammendrag:

It is well known that randomness can be used as an effective tool to turn a priori ill-posed problems into well-posed ones. This is useful both for answering questions at the theoretical as well as the practical levels. Examples of the effectiveness of such an approach are abundant in the fields of optimization, numerical analysis, inverse problems, AI and machine learning, to name a few. On the other hand, continuous-time dynamical systems in the form of Ordinary Differential Equations and the related transport and continuity Partial Differential Equations, the main object of study in this thesis, appear in the modelling of several natural phenomena. A common characteristic of many such models is the lack of regularity of their input-data (i.e. vector fields) which makes the use of classical results, relying for the most part on smoothness assumptions, ineffective.

In this work, we study the effect of applying novel regularization maps to certain classical continuous-time dynamical systems with discontinuous vector fields and hence ill-posed a priori. We prove, among other results, that these regularization maps induce a modified dynamics enjoying well-posedness as well as increased stability, with respect to initial conditions. A key aspect of our main result is the preservation of the notion of solution when passing from the original problem to the regularized one.

Håkon Andreas Kolderup ved UiO forsvarte 19. juni 2020 sin avhandling *Geometric and arithmetic properties of motivic cohomology theories* for graden PhD.
Veiledere har vært Professor Paul Arne Østvær, Professor John Rognes, begge UiO, Professor Jean Fasel, Université Grenoble Alpes og Professor Robert Ray Bruner, Wayne State University..

Sammendrag:

The theme of my thesis lies at a borderland between algebraic topology and algebraic geometry

called motivic homotopy theory. I have studied so-called motivic cohomology theories, which are tools used to distinguish certain mathematical shapes from one another.

In algebraic topology the primary goal is to classify geometric shapes, much like the goal of particle physics is to classify the fundamental particles. A way of attacking this problem is to construct suitable invariants, which can be used to distinguish different shapes. For an early example of an invariant we can go back to 1758. In this year, the famous Swiss mathematician Leonhard Euler proved that the alternating sum of the number of vertices, edges and faces of a polygon always equals 2. This sum, now known as the Euler characteristic, is an important example of an invariant of a geometric object. Later it was discovered that the Euler characteristic is intimately linked with so-called cohomology groups, which are indispensable tools in the algebraic topologist?s toolkit.

However, a geometric object often arises as the set of solutions to an equation. These shapes, known as varieties, are the main objects of study in algebraic geometry. Varieties are equipped with a richer structure coming from the combination of arithmetic and geometric information. The classical cohomology groups are not sufficient to capture this extra information. Therefore new tools were needed, and these tools now go under the name motivic cohomology theories, or motives.

In my thesis I have shown how certain geometric data, known as correspondences, give rise to a parametrized family of motives. I have focused in particular on so-called Milnor-Witt motives, which can in a certain sense be thought of as the initial motivic cohomology theory. I have also studied how motives can be viewed as modules over appropriate ring spectra. Finally, I have made some explicit computations in Milnor-Witt motivic cohomology highlighting how motivic cohomology theories capture arithmetic information contained in varieties.

M.Sci. Jacopo Paglia ved NTNU forsvarte 4. juni 2020 sin avhandling *Statistical modeling for safer drilling operations* for graden PhD.
Veiledere har vært Professor Jo Eidsvik, NTNU (hovedveileder), og Senior Research Scientist Pierre Rolf Cerasi, SINTEF(Medveileder).

Sammendrag:

The large number of geophysical and geological data available makes the application of statistical methods of primary importance for decision support systems in the earth sciences. The goal of the thesis is to develop models and methodologies to improve data acquisition and assimilation processes in drilling operations. Understanding what type of measurements is needed can help to improve the uncertainty quantification of the variables of interest. The work presented focuses on application of statistical models in drilling operations, using measurements commonly gathered in the petroleum.

Siv.ing. Sølve Eidnes ved NTNU forsvarte 5.juni 2020 sin avhandling *Invariant - preserving integrators for differential equations* for graden PhD.
Veiledere har vært Professor Brynjulf Owren (hovedveileder) og Professor Elena Celledoni (medveileder), begge NTNU.

Sammendrag:

The field of geometric numerical integration concerns numerical methods that preserve geometric properties of the system it models. The main focus of this thesis is on methods for ordinary differential equations (ODEs) that preserve invariants. Following an appropriate spatial discretization of partial differential equations (PDEs), such methods applied to the time-discretization can preserve discrete approximations to invariants in that setting also. The thesis concludes with two papers on shape analysis on homogeneous manifolds.

The concrete ODE solvers studied are discrete gradient methods and Kahan?s method. In the PDE setting, discrete gradient methods are combined with moving mesh techniques. In the ODE setting, order theory is developed, and the methods are extended to Riemannian manifolds. For Kahan?s method, the focus is on the geometric properties of this when applied to Hamiltonian PDEs.

NYTT FRA IMU

Dear colleagues,

The ongoing COVID-19 pandemic has affected modern society globally. Tragically, many thousands have died, many more have lost their jobs, and it has changed the working conditions of billions of people.

In response to the situation, we have launched the website

https://www.mathunion.org/corona

containing links to some resources pertaining to the pandemic. We focus on three aspects:

- general websites with information on the COVID-19 pandemic
- online seminars for a global audience
- websites which concentrate on mathematical research on the pandemic

For this website to be useful, we depend on active feedback from the community. Please send links to be included to

corona@mathunion.org

Please communicate the information about our website in your community.

Thanks!

Regards,
Helge Holden
IMU Secretary General

STUBBANS MATEMATISKE PRIS 2019/2020

Hanna og John Olav Stubbans matematiske fond ved NTNU ble opprettet i 2001 (se www.math.ntnu.no/stubban), og fra fondet deles det hvert studieår ut en pris til den eller de masterstudentene har oppnådd de beste karakterene innen matematiske fag. Årets pris består av diplom og 30.000 kr.

Årets prisvinnere er **Erlend Bergtun**, **Karine Hagesæther Foss** og **Henrik Syversveen Lie**.

Erlend Bergtun kommer fra Ålgård og er master i matematiske fag ved IMF. Masteroppgaven har han skrevet innen fagfeltet differensialgeometri. Veileder har vært Professor Gereon Quick. Erlend starter som doktorgradsstipendiat innen topologi ved IMF fra høsten.

Karine Hagesæther Foss kommer fra Sola og har mastergrad fra studieretningen Industriell matematikk ved IMF. Masteroppgaven har hun skrevet innen fagfeltet statistikk i rom og tid med Professor Jo Eidsvik som veileder. Karine arbeider nå hos BearingPoint i Oslo.

Henrik Syversveen Lie kommer fra Bærum og har mastergrad fra studieretningen Industriell matematikk ved IMF. Masteroppgaven er skrevet innen fagfeltet romlig statistikk med Professor Jo Eidsvik som veileder. Henrik starter i jobb hos Boston Consulting Group i Oslo til høsten.

Prisen ble delt ut på IMFs digitale utmatrikulering 12. juni 2020.

Hanna og John Olav Stubban

John Olav Stubban (1909-1994) var professor i matematikk ved Norges tekniske høgskole (NTH) i perioden 1956-1974, men han deltok også aktivt i oppbyggingen av et undervisningstilbud i matematikk ved Norges Lærerhøyskole (NLHT). Han var kjent som en fremstående pedagog og inspirerende foreleser. Hans viktigste vitenskapelige bidrag var innen retningsgeometri og algebraisk geometri.

Hanna og John Olav Stubbans matematiske fond ved Norges teknisk-naturvitenskapelige universitet (NTNU) ble opprettet i 2001 med midler testamentert av Stubban og donert av Stubbanfamilien. Styret for fondet er p.t. Peter Lindqvist, Mette Langaas og Sverre Smalø.