Holomorphic Day, April 16, 2010
Department of Mathematical Sciences
University of Copenhagen

Abstract

The purpose of the holomorphic day is to bring together people who use holomorphy in an essential way in their research. The event is supported by grant 272-07-0321 from FNU.

1 Schedule

The lectures take place at the premises of the Department of Mathematical Sciences, Universitetsparken 5, Copenhagen.

Arrival, coffee, tea: 9.45-10.15 in E 419 (Fourth floor)

Christian Henriksen: 10.15-11.00 in Aud. 7
Thurston's Algorithm

John H. Hubbard: 11.15-12.00 in Aud. 7
Analytic construction of the Deligne-Mumford compactification of moduli spaces of curves

Lunch: 12.00-13.15

Alexander Rashkovskii: 13.15-14.00 in Aud. 6
Cancelled

Henrik Laurberg Pedersen: 14.15-15.00 in Aud. 6
Real results by complex methods: volume of the unit ball in $\mathbb{R}^n$ *and the class of Nevanlinna-Pick functions*

Coffee break: 15.00-15.30

John H. Hubbard: 15.30-16.15 in Aud. 6
Pinched ball models for Hénon maps

Carsten Lunde Petersen: 16.30-17.15 in Aud. 6
Carrots for dessert

Dinner: 18.30-

2 Abstracts

Christian Henriksen, Associate professor, Technical University of Denmark: *Thurston's Algorithm.*

Thurston's has given a precise criterion for when a ramified covering map F is equivalent to a rational mapping. The proof works by showing that a certain endomorphism of a Teichmuller space has a fixed point. Using the ideas in Thurston's proof, one can construct an iterative scheme that finds a sequence of rational maps that converges towards a rational map equivalent to F, when there exists such a rational map. This scheme has been modified so that it can be implemented on a computer for two classes of degree 2 mappings. We will indicate how this is also possible for ramified coverings of degree greater than two.

Henrik Laurberg Pedersen, Associate Professor, Faculty of Life Sciences, University of Copenhagen: *Real results by complex methods: volume of the unit ball in* $\mathbb{R}^n$ *and the class of Nevanlinna-Pick functions.*

The volume Ω_n of the unit ball in $\mathbb{R}^n$ can be expressed in terms of Eulers gamma function Γ in the formula $\Omega_n = \pi^{n/2}/\Gamma(1+n/2)$. This leads to an investigation of the function

$$f(x) = \left(\frac{\pi^{x/2}}{\Gamma(1+x/2)}\right)^{1/x\log x}.$$

We obtain that $f(x+1)$ is a completely monotonic function and hence that

$$\{\Omega_{n+2}^{1/(n+2)\ln(n+2)}\}$$

is a Hausdorff moment sequence, i.e. of the form $\int_0^1 x^n \, d\mu(x)$ for a positive measure μ. The proofs are based on properties of the function F_2, where

$$F_a(z) = \frac{\log\Gamma(z+1)}{z\log(az)}.$$

We show that this is a Nevanlinna-Pick function, i.e. has non-negative imaginary part in the upper half plane, when $a \geq 1$ and obtain from this the properties of $f(x+1)$. **John H. Hubbard**, Professor, Cornell and Marseille University: *Pinched ball models for Hénon maps.*

The pinched disk model for Julia sets of polynomials is our main tool for understanding their geometry. The fact that the leaves of the corresponding *laminations* must not cross puts drastic restrictions on what laminations can arise; As a consequence Julia sets are almost determined (topologically) by this requirement and the compatibility with $\theta \mapsto 2\theta$. The objective of the talk will be to try to find something analogous for Hénon mappings. The situation is of course much more complicated; it isn't clear in what ball to put the lamination, or what the lamination should be, or what non-crossing means,... In collaboration with Remus Radu and Raluca Tanase, we have come up with possible answers.

Organized by **Christian Berg, Bodil Branner, Henrik Laurberg Pedersen, Carsten Lunde Petersen**