UNIVERSITÄT DES SAARLANDES
Fakultät für Mathematik und Informatik
Fachrichtung Mathematik

Mathematisches Kolloquium

Am Freitag, dem 08. Februar 2019 spricht um 14 Uhr c. t. im Hörsaal IV der Fachrichtung Mathematik (Gebäude E2 4)

PD Dr. Hendrik Vogt
Universität Bremen

über das Thema:

Large time behaviour of heat kernels

Abstract: In my talk, I start out from heat propagation in a bounded domain Ω with "cooling" at the boundary. This is modelled by the heat equation with zero Dirichlet boundary condition,

$$\partial_t u = \Delta u, \qquad u(0,\cdot) = f, \qquad u(t,x) = 0 \quad (t > 0,\ x \in \partial\Omega),$$

where $f \in L_2(\Omega)$ models the initial distribution of heat within Ω, and $u(t,\cdot)$ describes the distribution at time $t > 0$.

The large time behaviour of the solution u is well-known: one has

$$e^{tE_0} u(t,\cdot) \to c_f \phi_0 \qquad (t \to \infty),$$

where $c_f = \int_\Omega f(x)\phi_0(x)\,dx$ and $E_0 > 0$ is the smallest eigenvalue of the Dirichlet Laplacian $-\Delta_{\mathrm{D}}$ on Ω with normalised eigenfunction ϕ_0, i.e., $-\Delta\phi_0 = E_0\phi_0$, $\phi_0|_{\partial\Omega} = 0$ and $\|\phi_0\|_2 = 1$.

I will discuss variations and generalisations of the above result, in the general context of positivity improving selfadjoint C_0-semigroups on L_2-spaces. This framework encompasses all irreducible semigroups coming from Dirichlet forms as well as suitable perturbations thereof. It includes, in particular, Laplacians on connected manifolds, metric graphs and discrete graphs.

The talk is based on joint work with M. Keller, D. Lenz and R. Wojciechowski.

Der Gast wird von PD Dr. Yana Kinderknecht betreut.

Alle Interessenten sind zum Vortrag herzlich eingeladen.

Kaffee und Tee ab 13.45 Uhr im Konferenzraum der Mathematik (Erdgeschoss, Raum 1.03)

Die Dozenten der Mathematik