YOUNG RESEARCHERS' SESSION (THU 8/1/26)

ROOM S212 (14-15.50)

Lassi Rainio (University of Jyväskylä)
Construction of Laakso-type fractal spaces **(14-14.20)**

In this talk, I will present the construction of (symmetric) Laakso-type fractal spaces. This class of metric spaces provides new examples of fractal spaces for which difficult problems, such as the attainment problem of conformal dimension, can be resolved. Joint work with Riku Anttila and Sylvester Eriksson-Bique.

Johanna Immonen (Aalto University)
Boundary Behaviour of Chordal Schramm Loewner Evolution **(14.30-14.50)**

Chordal SLE is a family of measures for random, fractal curves that connect two boundary points in a simply connected domain. SLE curves arise in statistical physics as candidates for the conformally invariant scaling limits of random interfaces of lattice models. So-called boundary SLE Green's function is a suitably normalised probability that the curve visits a fixed boundary point. Explicit form for the Green's function is known for one and two fixed boundary points. In this talk, I discuss and explain to the general mathematical audience results that give an explicit form for multi point boundary SLE Green's function. The talk is based on ongoing joint work with Konstantin Izyurov, Kalle Kytölä and Eveliina Peltola.

Niilo Heikkinen (University of Helsinki)
Tensor Network Methods for Differential Equations **(15-15.20)**

Over the last couple of decades, tensor network methods have become central to numerical many-body quantum physics. They provide compact and efficient representations of high-order tensors by expressing them as networks of lower-order ones. A particularly well-known and widely used example is the matrix product state (MPS) representation, also known as the tensor train (TT) representation.

Recently, there has been growing interest in applying tensor network ideas in other braches of science and mathematics. Notable progress has been made in applying these "quantum inspired" methods to numerical integration and solutions of differential equations arising in various different fields.

In my presentation, I will give an overview of the basic theory of tensor networks, with an emphasis on matrix product states in both finite- and infinite-dimensional Hilbert spaces. I will also discuss the quantics tensor cross interpolation (QTCI) method that has shown potential in solving partial differential equations numerically.

Shubham Jaiswal (University of Jyväskylä)
An inverse source problem for a quasilinear elliptic equation **(15.30-15.50)**

We study inverse source problems for quasilinear elliptic equations i.e.,

$$\begin{cases} \nabla \cdot (\gamma(x, u, \nabla u)\nabla u) = F & in\ \Omega \\ u = f & on\ \Omega \end{cases}$$

on a bounded domain $\Omega \subset \mathbb{R}^n$, $n \geq 2$. We consider the non-linearity of the form $\gamma(x, u, \nabla u) = \sigma + qu$ and use nonlinearity to break the gauge of the inverse source problem for this type. For this, we try to recover the $\gamma(x, u, \nabla u)$ and $F(x)$ uniquely from the related Dirichlet-to-Neumann (DN) map. Here, nonlinearity helps, since for a linear equation it is not possible to recover both the conductivity and the source term. The method we use is the higher order linearization method and the key idea is to use unique continuation results for a coupled elliptic system. This is a joint work with Tony Liimatainen.