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The linearized KdV equation on metric graphs

The Korteweg-de Vries equation

$$\partial_t u = \partial_x^3 u + c\partial_x u - 6u\partial_x u$$

with some constant $c \in \mathbb{R}$ describes waves in shallow water channels. Linearizing around the stationary solution $u = 0$ yields the so-called Airy equation, which is of the form

$$\partial_t u = \alpha\partial_x^3 u + \beta\partial_x u,$$

where α, β are constants. We will study this linearized KdV equation on metric graphs by means of semigroup methods. The main aim is to characterize coupling conditions at the vertices of the metric graph such that the equation becomes well-posed and has "nice" properties.

This talk is based on a joint work with D. Mugnolo and D. Noja, see [1], [2].

References

[1] D. Mugnolo, D. Noja, and C. Seifert, *Airy-type evolution equations on star graphs*, Anal. PDE **11** (2018), no. 7, 1625–1652.

[2] C. Seifert, *The linearised Korteweg-de Vries equation on general metric graphs*, The Diversity and Beauty of Applied Operator Theory (A. Böttcher, D. Potts, P. Stollmann, and D. Wenzel, eds.), Operator Theory: Advances and Applications 268, Birkhäuser, 2018.