Nonlinear PDEs on Metric Graphs and Branched Networks
27 – 31 August 2018 Lorentz Center@ Snellius

This workshop focussed on recent progress in a new area of mathematical physics and applied analysis, namely, the dynamics of nonlinear PDEs on metric graphs and branched networks. It was the second event in a series of workshops on this topic (the previous had taken place at Oberwolfach (Germany) in 2017, the next is planned in the context of the Equadiff conference in 2019 with several meetings to come in the following years).

Since this theme is an emerging subject availing of combinations and extensions of techniques from various communities in mathematics and physics, it is essential to organize scientific events overcoming these boundaries and encouraging cross-fertalization, the ultimate goal being the formation of an independent research branch with its own agenda and the discovery of a wealth of new phenomena. While there are many exciting directions in which this community could move, the workshop was dedicated to four major themes: Dynamical system methods for nonlinear PDEs on metric graphs, Stability of trapped nonlinear states on metric graphs, Transport and scattering of nonlinear waves in branched structures, Homogenization and spectral properties of periodic networks.

During this workshop numerous new advances were presented: in the context of special graphs (such as star or loop graphs) with special boundary conditions a lot is already known. In particular, many results in the nonlinear setting concentrate on the construction of explicit solutions. Each day ended with a looking forward session in which a number of open problems were ellucidated. It was concluded at the end of the meeting that among the most important general future trends in this community are: the treatment of more general graphs and boundary conditions, rigorous linear/nonlinear stability of nonlinear waves on graphs and numerical methods for graphs.

The workshop was very well received by the participants. The Lorentz Center was perceived as a very pleasant and inspiring place to hold scientific meetings (with the only small drawback of lacking a large blackboard for talks). In fact, several participants are planning to organize a Lorentz Center workshop themselves sometime in the future.

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