1158-47-12 **Sven-Ake Wegner*** (`s.wegner@tees.ac.uk`), Middlesbrough, TS13BX, United Kingdom.
Port-Hamiltonian PDEs on infinite networks.

We consider the port-Hamiltonian partial differential equation

$$\frac{\partial x}{\partial t}(\xi,t) = P_1\frac{\partial}{\partial \xi}(\mathcal{H}(\xi)x(\xi,t)) + P_0\,\mathcal{H}(\xi)x(\xi,t) \text{ for } t \geqslant 0 \text{ and } \xi \in \Gamma.$$

Here, $\Gamma=(V,E)$ is a graph in which each edge $e\in E$ comes with an interval $I_e\subseteq\mathbb{R}$ and $\xi\in\Gamma$ means $\xi=(\xi_e)_{e\in E}$ with $\xi_e\in I_e$. Under suitable conditions on the matrices P_0, $P_1\in\mathbb{C}^{n\times n}$, the Hamiltonian $\mathcal{H}=\mathcal{H}(\xi)$ and the graph Γ we identify boundary conditions that, imposed at the vertices $v\in V$, turn the operator

$$A\colon D(A)\subseteq X_{\Gamma,\mathcal{H}}\to X_{\Gamma,\mathcal{H}},\; Ax=\Big(P_1\frac{\partial}{\partial\xi}+P_0\Big)(\mathcal{H}x)$$

into the generator of a C_0-semigroup on a suitable Hilbert space $X_{\Gamma,\mathcal{H}}$ associated with $\mathcal{H}$ and Γ. Results of this type are available for uniformly bounded $\mathcal{H}$, finite intervals and finite graphs. In the talk we discuss infinite intervals, infinite graphs and Hamiltonians that can be unbounded or tend to zero at infinity. The results are joint work with Birgit Jacob (Wuppertal) and Marcus Waurick (Glasgow). (Received December 23, 2019)