Second-order boundary value problems with dynamic boundary conditions

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In this talk, we consider boundary value problems with dynamic boundary conditions under various aspects. We discuss parabolic equations of the form $\partial_t u + A(D)u = f$ in the half-space, with a dynamic boundary condition of the form $B_0(D)u + \partial_t \rho + C_0(D')\rho = g$, where the unknown ρ is defined on the boundary and which is connected with u via a coupling condition of the form $B_1(D)u + C_1(D')\rho = 0$.

We discuss conditions for well-posedness, generation of an analytic semigroup, and existence of a bounded H^∞-calculus for the corresponding operator matrix. For the last result, we use a diagonalization trick and results on parameter-elliptic pseudo-differential operators. For low regularity of the boundary data, one has to define the trace on the boundary in a generalized sense.

This talk is based on joint work with Simon Bau and Annalena Mattes (both Konstanz).