Hamilton Institute

**A Joint Approach for the Simulation & Control
of Differential-Algebraic Systems**

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Abstract

We discuss the analysis and numerical solution of over- and underdetermined systems of nonlinear differential-algebraic equations.

Such equations allow a unified treatment of simulation and control problems for many systems arising in applications such as circuit theory or multibody systems. The general approach that we present is useful, in particular, for systems that are automatically generated, since then typically the system has redundancies. Our approach incorporates control problems via the behaviour framework.

We give a general (local) existence and uniqueness theory, discuss issues like the appropriate index, and we show when general nonlinear implicit control problems can be made regular by state or output feedback.

The theoretical analysis also leads to new numerical methods for the simulation as well as the construction of feedbacks. We present some numerical examples.
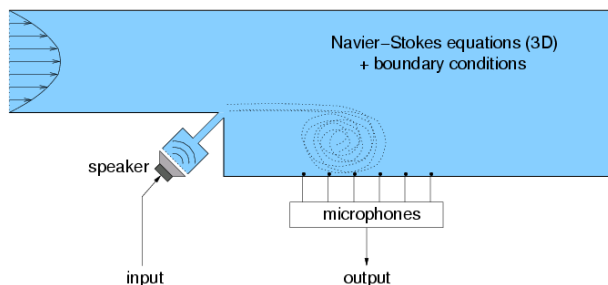
Venue: Seminar Room, Hamilton Institute, Science Building,
          NUI Maynooth

Time: 1.00 - 2.00pm (followed by tea/coffee)

Travel directions are available at www.hamilton.ie

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