



Contribution ID: 7

Type: **Poster**

Passive feedback control for nonlinear systems

Monday 26 May 2025 17:10 (1h 50m)

Dynamical systems can be used to model a broad class of physical processes, and conservation laws give rise to system properties like passivity or port-Hamiltonian structure. An important problem in practical applications is to steer dynamical systems to prescribed target states, and feedback controllers combining a regulator and an observer are a powerful tool to do so. However, controllers designed using classical methods do not necessarily obey energy principles, which makes it difficult to model the controller-plant interaction in a structured manner. In this talk, we show that a particular choice of the observer gain gives rise to passivity properties of the controller that are independent of the plant structure. Furthermore, we state conditions for the controller to have a port-Hamiltonian realization and show that a model order reduction scheme can be deduced using the framework of nonlinear balanced truncation. Two dimensional numerical examples based on physical models will illustrate benefits and current limitations of the method.

Authors: KARSAI, Attila (TU Berlin); BREITEN, Tobias

Presenter: KARSAI, Attila (TU Berlin)

Session Classification: Poster Blitz & Poster Section