

## Robusno distribuirano upravljanje mrežama dinamičkih sustava

Distribuirano upravljanje označava upravljačku strukturu u kojoj se svaki pojedini sustav u mreži upravlja jednim lokalnim regulatorom, koji pak komunicira s nekim (obično relativno malim) podskupom preostalih regulatora u mreži. U ovom predavanju razmatrat ćemo problem regulacije dinamičkih mreža sa nesigurnostima, gdje se svaki sustav u mreži modelira kao linearan vremenski invarijantan sustav sa nesigurnosti u LFR (linear fractional representation) reprezentaciji. Predstaviti ćemo konstruktivnu metodu sinteze robusnih distribuiranih regulatora koja se temelji na teoriji disipativnosti.

## Robust distributed control of networks of dynamical systems

Distributed control is a term used to denote a control structure in which each system in a network of dynamical systems is controlled by a single local controller, which in turn can communicate/coordinate its actions with (usually small) subset of the remaining local controllers in the network. In this talk, network dynamics is considered to be uncertain and each system in the network is modeled as a linear time invariant system with an uncertainty in form of linear fractional representation (LFR). We present distributed robust controller synthesis approach based on dissipativity theory and built on constructive algorithms from robust control and LPV control synthesis. Considered dynamic performance metrics is defined in terms of L-2 gain of the predefined performance channel. Complexity issues and inherent trade-offs in controller design are presented and discussed. Application of the presented theoretical results is illustrated on example of real-time power balancing control of electrical power systems.