

1. Record Nr.	UNINA9910795475903321
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Titolo	Controller and network design exploiting system structure // Simone Schuler
Pubbl/distr/stampa	Berlin : , : Logos Verlag Berlin, , [2015] ©2015
ISBN	3-8325-9517-1
Descrizione fisica	1 online resource (133 pages)
Disciplina	624.17
Soggetti	Structural optimization
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	PublicationDate: 20150315
Sommario/riassunto	<p>Long description: We consider the problem of decentralized controller and network design under communication constraints. Traditionally, this problem is solved in a two-step approach by first deciding on a topology and then designing the dynamical couplings. In this thesis, we present a new approach by solving the problem of topology design and dynamics within one joint optimization problem. Structure design is then done subject to classical performance constraints on the closed loop system. We develop computationally efficient formulations by means of convex relaxations. This makes the proposed design methods attractive for practical applications and allows a tradeoff between sparsity of the subsystem interactions and achievable performance. We further introduce the concept of an I0-system gain for discrete linear time invariant systems, inspired by classical system gains from robust control. With this newly introduced system gain, we give a system theoretic explanation of the sparse closed loop response of l1-optimally controlled systems.</p>