Xie, Xiangpeng; Shen, Xicheng; Peng, Chen
Relaxed stabilization synthesis of discrete-time nonlinear systems with uplink data loss based on a novel online evaluation mechanism. (English) Zbl 07484253

Summary: The problem of promoting the adaptability to uplink data loss for nonlinear plant is addressed via developing the fuzzy gain-scheduling stabilization law based on a novel online evaluation mechanism. Different from those previous methods, the proposed online evaluation mechanism is dependent not only the current-time but also the past-time normalized fuzzy weighting functions, and thus much more information can be absorbed and utilized in the process of stabilization synthesis by introducing extra free matrices than before. More importantly, an additional constraint is for the first time proposed for updating the plant status instantly so that critical replacement operations can be implemented for reducing the conservativeness of the designing conditions. Therefore, the adaptability to uplink data loss is improved evidently and thus the worse communication quality of uplink channel is bearable in this study. Finally, the advantages relative to those reported ones are tested and validated through benchmark numerical comparisons.

MSC:
93Cxx Model systems in control theory
93Bxx Controllability, observability, and system structure
93Exx Stochastic systems and control

Keywords:
networked systems; fuzzy model; nonlinear systems; packet loss; unreliable channels

Full Text: DOI

References:


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