Abstract: The complexity of gene regulatory networks described by coupled nonlinear differential equations is often an obstacle for analysis purposes. They are prone to internal parametrical fluctuations making thus robustness a crucial property of these networks to attenuate the effects of internal fluctuation. Therefore, the development of effective model reduction techniques for uncertain biological systems is of paramount importance in the field of systems biology. In this paper, we apply a Gramian-based approach for model reduction for gene regulatory networks based only on finding generalized Gramians and standard matrix transformations. The method is based on finding a generalized controllability and observability Gramian of the uncertain system and then based on a state transformation matrix a reduced-order representation. Under the assumption that the structured uncertainties are norm-bounded, we can prove that the reduced-order balanced system is also stable.
Occurences:
- Einrichtungen > Fakultäten > Fakultät für Mathematik > Zentrum Mathematik > M12 Mathematische Modelle biol. Systeme (Prof. Theis) > Lehrstuhl für Mathematische Modelle biol. Systeme (Prof. Theis)

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