

عنوان مقاله:

Chaos Control in Gear Transmission System using GPC and SMC Controllers

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خلاصه مقاله:

Chaos is a phenomenon that occurs in some non-linear systems. Therefore, the output of the system will be heavily dependent on the initial conditions. Since the main characteristic of the chaos is an abnormal behavior of the system output, it should be considered in designing control systems. In this paper, controlling chaos phenomenon in a time-variant non-linear gear transmission system is investigated. To do this, a non-linear model for the system is introduced considering the effective parameters of the system, and then it is shown that chaos appears in the system by plotting phase plane of state-space variables. It should be noted that there is a great difference between random and chaotic behavior. In random cases, the model or input contains uncertainty, and therefore, the system behavior and output are not predictable. However, in chaotic behavior, there is only a brief uncertainty in the system model, input or initial conditions, and designing controller based on output prediction could be achieved. Therefore, model predictive control (MPC) algorithms are used to control the chaos, using the output prediction concept. In many cases, perturbation term also can be considered as uncertainty, and therefore, a robust controller family can be used for eliminating chaos. Both generalized predictive controller (GPC) and sliding mode controller (SMC) are used for chaos control here. The simulation results show the efficiency of the proposed algorithms

کلمات کلیدی:

Gear transmission system, Chaos, Model predictive control, GPC, Sliding mode, SMC, Nonlinear

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