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PSO-based state feedback regulator for stabilizing a two-wheeled wheelchair in balancing mode (Conference Paper)

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Abstract

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In this paper, the state feedback control design problem for stabilizing a two-wheeled wheelchair in balancing mode is considered. The system is modeled as double inverted pendulum on two wheels. The calculation of state feedback control gains is conventionally handled by LQR method via Riccati equation. Unfortunately, the method still possesses trial and error approach when choosing some parameters, in particular tuning the elements of Q and R weighting matrices. Therefore, an intelligent numerical method to resolve this problem is proposed by adopting PSO algorithm. The simulation work is carried out to evaluate the effectiveness of the proposed method. The result shows that the numerical method reduces tuning time and improves the performance of the system. © 2015 IEEE.

Author keywords

LQR optimization PSO state feedback control two-wheeled wheelchair

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