



# Trajectory Planning and Tracking of Bilinear Systems Using Orthogonal Functions

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**Abstract:** This paper proposes a trajectory planning and tracking approach for bilinear systems that approximate weakly nonlinear systems, based on orthogonal functions and especially the use of operational integration and product matrices. These operational tools allow the conversion of a bilinear differential state equation into an algebraic one depending on initial and final conditions. Arranging and solving the obtained algebraic equation lead to an open loop control law that allows the planning of a system trajectory. The parameters setting of the tracking state feedback closed loop control is yielded by considering a reference model characterizing the desired performances.

**Keywords:** *bilinear systems; trajectory planning; orthogonal functions; trajectory tracking.*

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