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Adaptive control of cooperative robots in the presence of disturbances and uncertainties: A Bernstein–Chlodowsky approach

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Description The function approximation technique (FAT) is a powerful mathematical tool recently utilized to design model-free controllers for robots. However, some FAT-based controllers depend on joint velocities, which may not be available in many real-world applications. This problem is solved in this paper by proposing an output feedback tracking control for cooperative robotic arms using the Bernstein–Chlodowsky polynomial as an uncertainty approximator. In other words, the Bernstein–Chlodowsky approach is adopted to approximate the lumped uncertainties consisting of disturbances and unmodeled dynamics. An adaptive rule is then suggested to update the approximator's coefficients matrix. Moreover, it is assured that controlled system error signals are uniformly ultimately bounded (UUB) utilizing the Lyapunov lemma. Finally, the designed Bernstein–Chlodowsky controller is applied to a cooperative system with ...

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