Joint Space Hybrid Force/Position Control of 6-DoF Robot Manipulator Using Neural Network

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Abstract : It has been known that the performance of position and force control is highly affected by both robot dynamic and environment stiffness uncertainties. In this paper, joint space hybrid force and position control strategy with self-selecting matrix using artificial neural network compensator is proposed. The objective of the work is to improve controller robustness by applying a neural network technique in order to compensate the effect of uncertainties in the robot model. Simulation results for a 6 degree of freedom (6-DoF) manipulator and different types of environments showed the effectiveness of the suggested approach. 6-DoF Puma 560 family robot manipulator is chosen as industrial robot and its efficient dynamic model is designed using Matlab/SimMechanics library.
Keywords : robot manipulator, force/position control, artificial neural network, Matlab/Simulink
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