Model Identification of 3R Palnar Robot using Neural Network and Adaptive Neuro-Fuzzy Inference System

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Abstract:
The robot is used in many industries for various important purposes like welding, soldering, painting and material handling works like sorting, palletizing, picking, packing, etc. To do the work perfectly the robot's inverse kinematics model is very much important. Usually, the traditional method such as iterative, geometric, and algebraic is used to calculate the inverse kinematics model. A robot with 2 or fewer degrees of freedom, the finding of inverse kinematics by the traditional method is quite simple. But if the degree of freedom increases then the model identification becomes more complex and too expensive in computation. To overcome this solution the emerging artificial intelligence techniques are used. Two methods of artificial intelligence like neural network and adaptive neuro-fuzzy inference system are used to identify the inverse

kinematics of 3R planar robot. The input data like X and Y coordinates and output data like joint angles θ_1, θ_2 and θ_3 are generated using the forward kinematics equation of the robot. In both methods, the input and output data are given to train the model. The training of the model is stopped and finalized when the error of the model comes under the tolerable limit. For evaluating the designed model, both models are compared with the derived algebraic model of the robot. The comparison helps to prove that the ANFIS model is better than the NN model

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