

An Inverse Optimal Control Approach for the Nonlinear System Design Using ANN

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Abstract : The design of a feedback controller, so as to minimize a given performance criterion, for a general non-linear dynamical system is difficult; if not impossible. But for a large class of non-linear dynamical systems, the open loop control that minimizes a performance criterion can be obtained using calculus of variations and Pontryagin's minimum principle. In this paper, the open loop optimal trajectories, that minimizes a given performance measure, is used to train the neural network whose inputs are state variables of non-linear dynamical systems and the open loop optimal control as the desired output. This trained neural network is used as the feedback controller. In other words, attempts are made here to solve the "inverse optimal control problem" by using the state and control trajectories that are optimal in an open loop sense.

Keywords : inverse optimal control, radial basis function, neural network, controller design

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