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(54) **SYSTEM FOR INTELLIGENT CONTROL BASED ON SOFT COMPUTING**

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(57) **ABSTRACT**

A reduced control system suitable for control of a nonlinear or unstable plant is described. The reduced control system is configured to use a reduced sensor set for controlling the plant without significant loss of control quality (accuracy) as compared to an optimal control system with an optimum sensor set. The control system calculates the information content provided by the reduced sensor set as compared to the information content provided by the optimum set. The control system also calculates the difference between the entropy production rate of the plant and the entropy production rate of the controller. A genetic optimizer is used to tune a fuzzy neural network in the reduced controller. A fitness function for the genetic optimizer provides optimum control accuracy in the reduced control system by minimizing the difference in entropy production while maximizing the sensor information content.

10 Claims, 10 Drawing Sheets