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Self-Organizing Map Network for Wheeled Robot Movement Optimization

Authors : Boguslaw Schreyer

Abstract : The paper investigates the application of the Kohonen’s Self-Organizing Map (SOM) to the wheeled robot starting and braking dynamic states. In securing wheeled robot stability as well as minimum starting and braking time, it is important to ensure correct torque distribution as well as proper slope of braking and driving moments. In this paper, a correct movement distribution has been formulated, securing optimum adhesion coefficient and good transversal stability of a wheeled robot. A neural tuner has been proposed to secure the above properties, although most of the attention is attached to the SOM network application. If the delay of the torque application or torque release is not negligible, it is important to change the rising and falling slopes of the torque. The road/surface condition is also paramount in robot dynamic states control. As the road conditions may randomly change in time, application of the SOM network has been suggested in order to classify the actual road conditions.

Keywords : slip control, SOM network, torque distribution, wheeled Robot
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