中国机械工程 2012, 23(2) 240-243 DOI: ISSN: 1004-132X CN: 42-1294/TH

车辆工程

汽车驾驶机器人车速跟踪神经网络控制方法

陈刚1;**张为公**2

1.南京理工大学,南京,210094
2.东南大学,南京,210096

摘要:
为了实现汽车驾驶机器人对给定车速的准确跟踪,提出了一种驾驶机器人车速跟踪神经网络控制方法。网络模型输入层变量为驾驶机器人油门和制动器、离合器机械腿、换挡机械手的位移;中间层为隐层,节点数为5,神经元传递函数为正切传递函数;输出层变量为试验车辆车速,神经元传递函数为线性传递函数。
结果表明,该方法的收敛速度明显高于梯度下降法的收敛速度,且达到的控制精度更高,车速跟踪误差满足国家汽车试验标准的要求。

关键词:
汽车试验;驾驶机器人;车速控制;神经网络

Speed Control of Vehicle Robot Driver Based on Neural Network

Chen Gang1;Zhang Weigong2

1.Nanjing University of Science and Technology,Nanjing,210094
2.Southeast University,Nanjing,210096

Abstract:
To realize the vehicle speed tracking of given driving test cycle,a novel speed control method of vehicle robot driver based on neural network was proposed herein.The displacements of throttle pedal, brake pedal,clutch pedal and shift manipulator for vehicle robot driver were used as the input layer variables of the network model.The middle layer of the network model was used as hidden layer, which has five hidden nodes and whose neurons transfer function adopts tangent transfer function.The test vehicle speed was used as the output layer variable of the network model,whose neurons transfer function adopts linear transfer function.Results show that the convergence rate and control accuracy of the proposed method is higher than that of traditional gradient descent method.The vehicle speed tracking errors of the proposed method meet the requirements of China vehicle test standards.

Keywords:
vehicle test;robot driver;speed control;neural network

收稿日期 修回日期 网络版发布日期

DOI:

基金项目:

通讯作者:

作者简介:

作者Email:

参考文献:

本刊中的类似文章