

基于CAN总线和PSA模型的AMT在线故障诊断系统

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摘要: 为解决电控自动变速器故障诊断和维修问题,建立了基于CAN总线和PSA(PCA-subtractive clustering-ANFIS)模型的自动变速器故障在线诊断系统。通过CAN总线实时采集变速器控制单元各传感器状态数据作为诊断样本,利用主成分分析(PCA)实现输入变量降维和去相关,应用减法聚类(subtractive clustering)方法生成初始模糊推理结构,并以此建立自适应模糊神经网络(ANFIS)故障诊断模型。仿真结果表明,结合CAN总线网络应用的PSA故障诊断模型能够准确地诊断出变速器的故障,其拟合能力及收敛速度均优于PCA-BP网络模型。For the sake of fault diagnosis and maintenance problems of automated manual transmission (AMT), an online fault diagnosis system was established based on CAN bus and PSA (PCA-subtractive clustering-ANFIS) model. The original sample data of AMT fault diagnosis was derived from sensors of electronic control utilities (ECU) and transmitted on CAN bus. Principal component analysis (PCA) was used to reduce correlations and dimensions of input variables. An original fuzzy inference model was built by using subtractive clustering algorithm, on which an adaptive-network-based fuzzy inference system (ANFIS) was based and adopted to build a new type fault diagnosis model. Experimental result showed that combined with CAN bus, PSA model is effective, and both of its fitting ability and convergence speed are superior to PCA-BP network model.

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