

基于PSO的BP神经网络在压力传感器温度补偿中的应用

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摘要:

针对硅压阻式压力传感器的温度漂移问题, 提出了基于粒子群优化算法(particle swarm optimization algorithm, PSO)的BP神经网络的温度补偿模型, 通过粒子群化算法对BP网络的权值和阈值进行全局寻优, 克服了BP网络收敛速度慢和易陷入局部极值的缺陷, 而且温度补偿的精度较高。研究表明, 该方法有效的抑制了温度对压力传感器输出的影响, 提高了传感器的稳定性和准确性。

关键词: 温度补偿; 粒子群优化算法; BP神经网络; 压力传感器

The Application of BP Neural Network Based on PSO Algorithm to Pressure Sensor Temperature Compensation

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Abstract:

For the temperature drift of the silicon piezoresistive pressure sensor, compensation method by Back Propagation (BP) network based on Particle Swarm Optimization (PSO) algorithm has been proposed. This model has overcome the drawback of slow convergence and easily trapping in the local minimum of BP network through global search weight and threshold in PSO algorithm. The simulation experiment results show that the model can depress the temperature drift of the silicon piezoresistive pressure sensor effectively, and the stability and accuracy of the silicon piezoresistive pressure sensor are improved greatly.

Keywords: temperature compensation; particle swarm optimization algorithm; BP network; pressure sensor

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