

拖拉机队列自动控制系统Automatic Control System of Tractors Platooning

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关键词: 拖拉机队列 自动控制 路径生成 路径跟踪器 最优控制

摘要: 为了提高拖拉机田间作业效率,开发了拖拉机队列自动控制系统。建立了拖拉机队列模型,设计了队列控制方法。首先应用三阶样条曲线拟合先行拖拉机的行驶位置点,动态生成跟踪拖拉机的参考路径。然后设计了最优路径跟踪器,用来引导跟踪拖拉机沿着参考路径行驶。在平坦的草地上进行了拖拉机队列的自动控制试验,试验结果表明,跟踪拖拉机能够成功沿着先行拖拉机的轨迹行驶,横向偏差的平均值和均方根值分别小于0.015m和0.079m。In order to increase the work efficiency, an automatic control system of tractors platooning was developed. A tractors platooning model was established and a platooning control method was designed. Firstly, a reference route for the following tractor was dynamically created from the position points of the leading tractor, and subsequently processed by the least squares fitting method to filter out some noise. Secondly, a feedback path-tracking controller was designed to guide the following tractor along the reference route. Field tests were conducted on a flat meadow. The results indicated that the following tractor followed up the leading one successfully with the mean and RMS lateral deviations of less than 0.015 m and 0.079m, respectively.

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