

## 联合收获机视觉导航控制器设计 Design of Vision Navigation Controller for Combine Harvester

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**关键词:** 联合收获机 视觉导航 速度自适应控制器 设计

**摘要:** 设计了一种速度自适应导航控制器。在搭建的联合收获机视觉导航试验平台上,提出了双闭环控制结构,采用PD控制,按照导航路径偏差形式,确定了偏差  $e$  的构成,试验得到了增益  $K$ 、控制周期  $T$  与行走速度  $v$  的关系,设计了小闭环控制方法,并提出了一种后轮中位动态标定方法。路面与田间试验结果表明:联合收获机能在不同速度下沿路面标示线自动行走,跟踪误差最大为0.05 m。在田间不同速度下,联合收获机均能跟踪收获与未收获边界,割幅变化范围在0.18 m以内。 A velocity adaptive navigation controller was designed. On the harvester vision navigation experimental platform, a double closed-loop control structure, which used PD control mode, was put forward and the navigational deviation was set up according to the deviation of the heading angle and lateral position of the structure. The relationships between the control parameters of the control gain  $K$  and the control period  $T$ , and the harvester speed  $v$  were experimentally obtained. The computing method of inner closed loop control was given based on the method of one dynamic calibration for the rear wheel at mid-position-voltage. The test results on road and in wheat field showed that the combine harvester could trace the navigation line at different speeds, and on the road, the maximal tracing error was 0.05m. In wheat fields, the change of harvesting width was in 0.18m during the working speed.

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