高速插秧机差速分插机构的工作原理及其CAD/CAE

Working principle and CAD/CAE of the separating-planting mechanism with differential elliptic gear system of high-performance rice transplanter

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中文摘要：

分插机构的创新是插秧机产品更新换代的关键技术之一，该文介绍了一种新型高速插秧机分插机构—差速分插机构的结构与工作原理，通过建立其数学模型，应用CAD/CAE技术进行辅助分析与设计，分别优化适于南方双季稻种植和北方插小苗要求的分插机构结构参数，并与日本高速插秧机分插机构的性能进行对比分析。实验台试验表明该分插机构运转平稳，验证了方案构思正确、可行，理论分析与试验情况一致。

英文摘要：

Innovation of the separating-planting mechanism is one of key technologies to innovate rice transplanter. Firstly, structure and work principles of a new type of the separating-planting mechanism with differential elliptic gear system of high-performance rice transplanter are introduced in this paper. Its kinematics models were established on the basis of the transmission analysis of differential elliptic gear system. According to the different agronomic requirements of South China and North China, CAD/CAE technology is applied to find out two sets of proper structural parameters easily. And its kinematic performances are compared with the separating-planting mechanism of high-performance rice transplanter made in Japan. Finally, the test shows that the separating-planting mechanism with differential elliptic gear system can work smoothly. Its scheme design is reasonable and practical, and the theoretical annalyses are in good agreement with the experiemental results.

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