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### 飞行器进近中的自适应协同传输与节点选择

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### Adaptive Cooperative Transmission and Node Selection in Aircraft Approach

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摘要

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**摘要** 针对单中继非再生放大转发(AF)的进近飞行器协同传输网络,在给出系统模型后,推导并分析了系统的输出信噪比(SNR)表达式,得到了中继节点参与协同传输的条件,提出了一种自适应的协同传输方案。目的节点判断是否采用中继传输并将结果发送到中继节点,中继节点根据接收到的信息调整传输模式。在此基础上,针对多节点正交性协同传输会显著降低系统的传输性能,给出了一种最大化系统输出信噪比界的节点选择方法,在多个节点中选择一个满足要求的节点参与协同传输。进一步,对协同节点间的最优功率分配进行了研究,得到了功率分配因子的最优解,提出了一种基于最优功率分配的协同节点选择方案。在完成节点选择后,目的节点经控制信道将选择结果及功率分配结果发送到中继节点,仅由选择的节点参与接下来的协同传输,其他节点则进入空闲状态。仿真结果表明,通过采用上述新方法,系统的性能可以得到显著提升。

**关键词:** 飞行器 进近 非再生放大转发 自适应协同传输 功率分配 节点选择

**Abstract:** This paper presents a study of the non-regenerative amplify-and-forward (AF) aircraft cooperative relay transmission network. The model of a single relay cooperative transmission system is given, and the expression of the output signal-to-noise ratio (SNR) is derived and analyzed. After that, the cooperative transmission condition of the relay node is acquired. Then an efficient adaptive cooperative transmission scheme is proposed. First, the destination node determines whether or not relaying should be adopted and it sends the result to the relay node. The relay node adjusts its transmission mode according to the information it receives from the destination. In view of the fact that multi-node orthogonal cooperative transmission may greatly reduce the capacity performance of the system, a novel relay selection method is proposed based on maximizing the bounds of the output signal-to-noise ratio, and a preferable node is selected for cooperative transmission. In order to improve system performance further, the optimal power allocation between the cooperative nodes is analyzed and the optimal solution of the power allocation factor is acquired, based on which a new relay selection scheme is proposed. After the relay node is selected, the destination broadcasts this result to the relays through the control channel and the selected node participates in the next cooperative transmission, while other nodes enter an idle state. Simulation results show that by using the methods proposed above, the performance of the system can be improved significantly.

**Keywords:** aircraft approach non-regenerative amplify-and-forward adaptive cooperative transmission power allocation node selection

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