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研究简报

基于最速下降法的车载网络功率控制研究

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Steepest Descent Method Based Transmission Power Control in Vehicular Networks

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摘 要 车载网络中的功率控制算法D-FPAV在功率值计算精度要求较高时，即计算功率值的步长λ取值较小时，存在计算量较大的问题。该文在D-FPAV算法的基础上提出了一种改进的功率控制算法最速下降功率控制SDPC算法，该算法运用了最速下降法快速收敛的原理。仿真结果表明，SDPC算法能够降低计算迭代次数，提高算法收敛速度，并且使得车辆发送状态信息的功率能够随车辆位置信息和环境的变化快速做出调整，从而能有效地进行信道拥塞控制，有利于提高车辆行驶的安全性。

关键词： 车载网络 功率控制 拥塞控制 SDPC算法 收敛速度

Abstract： The transmission power control algorithm D-FPAV(Distributed Fair Power Adjustment for Vehicular environments) becomes computational expensive when required calculation precision is high, i.e., the step λ is small. In this paper, a novel transmission power control algorithm SDPC(Steepest Descent Power Control) algorithm is proposed to improve D-FPAV. This algorithm is based on the rapid convergence theory of the steepest descent method. Simulation results show that the effectiveness of SDPC in terms of the number of iterations for computing the transmission power values decreases and converging speed. As a result, the transmission power to transmit their status information can be quickly adaptive to the vehicle dynamic and surroundings situations. Therefore, channel congestion can be effectively controlled and the security of vehicular networks can also be improved.

Keywords： Vehicular network Transmission power control Congestion control SDPC (Steepest Decent Power Control) algorithm Convergence speed

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