Optimization of Downlink Power Allocation in NOMA-OTFS based Cross-Domain Vehicular Networks

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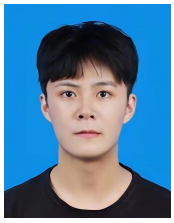
***Abstract*—Orthogonal time frequency space (OTFS) and non-orthogonal multiple access (NOMA) are pivotal for enhancing the transmission performance of vehicular communications. This paper delves into the downlink power allocation of a NOMA-OTFS system with a frequency domain linear equalizer (FD-LE), where a high-speed user in delay-Doppler domain and multiple low-speed time-frequency domain NOMA users coexist. Considering the fairness of NOMA users, we optimize the minimum rate of the low-speed users, constrained by the quality of service (QoS) of the high-speed user. To address this problem, we propose an iterative power allocation optimization (IP-AO) strategy and obtain an accurate optimal solution based on the auxiliary variables by transforming the original non-convex problem into a convex one. Moreover, we derive a closed-form solution for the optimal power allocation (OPA). Simulation results validate the superiority of our schemes over traditional power allocation methods in maximizing the minimum user rate in the NOMA-OTFS vehicular system.**

***Keywords*— OTFS, NOMA, Power allocation, IP-AO, OPA.**



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