

Performance Evaluation of Wiener Filter Designs for Channel Estimation in Vehicular Environments

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Abstract:

Future communication systems for car-to-x (C2X) applications have to meet stringent requirements regarding reliability issues. Channel estimation (CE) - as one of the key tasks that affect the system performance – has to be able to cope with the rapidly changing channel conditions. Applying a Wiener filter (WF) is one very efficient method to reduce the estimation error of any channel estimation approach. This paper deals with design aspects of Wiener filter coefficients and their impact on the system performance. Parameters like noise variance, maximum excess delay of the channel impulse response as well as the assumed shape of the power delay profile (PDP) are considered. The resulting performance benefit of different filter designs is evaluated by means of IEEE 802.11p physical (PHY) layer simulations.