System-level Assessment of Non-Orthogonal Spectrum Sharing via Transmit Beamforming

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Abstract:

We assess the system-level performance of non-orthogonal spectrum sharing achieved via max sum-rate (SR), Nash Bargaining (NB), and zero-forcing (ZF) transmit beamforming techniques. A look-up table based physical layer abstraction and radio resource management mechanisms (including packet scheduling) are proposed and incorporated in system-level simulations, jointly with other important aspects of network operation. In the simulated scenarios, the results show similar system-level performance of SR (or NB) as ZF in the context of spectrum sharing, when combined with maximum sum-rate (or proportional fair) pac ket scheduler. Further sensitivity analysis also shows similar behavior of all the three beamforming techniques with regard to the impact on system-level performance of neighbor-cell activity level and feedback error. A more important observation from our results is that, under ideal conditions, the performance enhancement of non-orthogonal spectrum sharing over orthogonal spectrum sharing and fixed spectrum assignment is significant.