# Accurate Spectral Efficiency Analysis for Non Orthogonal Multiple Access

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*Abstract*— **This paper presents theoretical analysis on non-orthogonal multiple access (NOMA) for both downlink and uplink communications. Based on accurate evaluation, we propose closed-form expressions of NOMA downlink and uplink spectral efficiency. In terms of channel modelling, we map the channel conditions with Nakagami and Rayleigh models in which both line-of-sight and non-line-of-sight are included. For uplink transmission, we extend our work to the case of random active users. The random nature is matched to appropriate probability models. These make our presented expressions very comprehensive and benefit us to study the impacts of channel conditions, random number of users, and other key system parameters on the NOMA spectral efficiency.**

*Keyword*— **Non orthogonal multiple access, 5G mobile communication, uplink, downlink, spectral efficiency**

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