

Although there has been a growing interest on the study of diversity-multiplexing tradeoff (DMT), the existing works are mostly restricted to the outcomes reported for Rayleigh, Rician, and Nakagami fading channels. In this paper, we investigate the optimal tradeoff in the presence of log-normal fading, which provides an accurate model for indoor wireless, optical wireless, and ultra-wideband channels. We consider a multiple-input multiple-output (MIMO) log-normal channel, derive the outage probability expression, and then present the asymptotical DMT expression. It is shown that the asymptotical maximum diversity gain tends to infinity with logarithm of signal-to-noise ratio (SNR). To have further insight, we normalize the DMT with that of single-input single-output case and express the relative asymptotical DMT of the MIMO log-normal channel as a function of the number of transmit and receive antennas. We further study DMT for finite SNRs and demonstrate convergence to the asymptotical case. Extensive numerical results are provided to corroborate the analytical derivation.