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Performance analysis of switch and stay combining diversity system over kappa-mu fading channels

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Abstract: This paper studies important performance measures for a dual-branch switch and stay combining (SSC) diversity system over kappa-mu fading channels. In particular, an expression for the moments of the output signal-to-noise ratio (SNR) is obtained in three different forms: in terms of an infinite series, a single finite-range integral and the Nuttall Q-function, where the moments expression is utilized to obtain expressions for the average output SNR, and amount of fading. An expression for the outage probability is also derived with SSC. Furthermore, the moment-generating function (MGF) is derived in terms of an infinite series, a single finite-range integral and the generalized Marcum Q-function, which is applied to derive an expression for the average bit error rate (BER) for various coherent modulation schemes. The BER for non-coherent detection is also derived. The infinite series in the final expressions are truncated and upper bounds on the truncation errors are obtained. Closed-form expressions for the optimum switching threshold are also derived. The corresponding expressions for Rician fading, and Nakagami-m fading are presented as special cases of kappa-mu fading. Finally, numerical and simulation results are offered for illustration purposes.