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Channel capacity of dual-branch diversity systems over correlated Nakagami-m fading with channel inversion and fixed rate transmission scheme

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Abstract: We derive closed-form expressions for the channel capacity of dual-branch maximal ratio combining, equal gain combining, selection combining, and switch and stay combining (SSC) diversity systems over correlated Nakagami-m fading for the channel inversion with fixed rate transmission scheme. Since some of the final capacity expressions contain infinite series, we truncate the series and present upper bounds on the truncation errors. We also derive an expression that can be used to numerically determine the optimum adaptive switching threshold for the capacity of a dual-branch SSC system over correlated Nakagami-m fading channels. A closed-form expression for the optimum adaptive switching threshold is derived however for the case of independent branches. The corresponding expressions for Rayleigh fading are obtained as a special case of Nakagami-m fading. Finally, we present numerical results and compare them to the capacity results we previously obtained for the rate adaptation with constant power transmission scheme.