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Abstract

In this paper the performance of amplify and forward relay system with Maximum Ratio Combining (MRC) and Selective Combining (SC) over Nakagami-m fading channels is studied by considering both MRC and SC schemes at the destination, we derive the cumulative density function (CDF), probability density function (PDF) and moment generating function (MGF) for the multiple relay AF network with single half duplex. In addition, we derive the exact Symbol Error Rate (SER) of M-ary phase-shift keying (M-PSK), in Nakagami -m fading environment. Simulation results are presented to show that system performance of the differential SC is comparable to the MRC at the receivers, and improves with the increase of repeaters, and different decoding methods have different effects on system performance.

References

1. N. C. Beaulieu and Y. Chen, "An accurate approximation to the average error probability of cooperative diversity in Nakagami-m fading," IEEE Trans. Wireless Commun., vol. 9, no. 9,

pp. 2707–2711, Sep. 2010.

2. J. N. Laneman, D. N. C. Tse, and G. W. Wornell, “Cooperative diversity in wireless networks: Efficient protocols and outage behavior,” *IEEE Trans. Inf. Theory*, vol. 50, no. 12, pp. 3062–3080, Dec. 2004.
3. M. K. Simon and M.-S. Alouini, *Digital Communication over Fading Channels*, 2nd ed. New York: Wiley, 2005.
4. Lei X, Beaulieu NC and Fan P. Precise MGF performance analysis of amplify-and-forward cooperative diversity in Nakagami-m fading. In *Information Theory. CWIT. 11th Canadian Workshop on 2009 May 13* (pp. 13-16). IEEE.
5. M. Nakagami. The m-distribution, a general formula of intensity distribution of rapid fading. in *Statistical Methods in Radio Wave Propagation*, W. G. Hoffman, ed. Pergamon Press, 1960; 3–36.
6. O. Waqar, D. C. McLernon, and M. Ghogho, “Performance analysis of non-regenerative opportunistic relaying in Nakagami-m fading,” in *Proc. IEEE Personal, Indoor Mobile Radio Commun. Conf. (PIMRC)*, Sep. 2009, pp. 231–235.
7. Chu, Shao-I. Performance of Amplify-and-Forward Cooperative Diversity Networks with Generalized Selection Combining over Nakagami-m Fading Channels. *IEEE Communications Letters*, May.2012.Vol. 16, No.5: 634-637.
8. Ali A. Mohammed, Li Yu, Manar Al-Kali and Desheng Wang. Analysis of Amplify-and-Forward Cooperative Networks with Nakagami-m fading Channels for MRC Diversity Combining. *TELKOMNIKA Indonesian Journal of Electrical Engineering*, 2015, 16(3):546-552.
9. Khan, I., Rajatheva, N., Tanoli, S. A., & Jan, S. (2014). Performance analysis of cooperative network over Nakagami and Rician fading channels. *International Journal of Communication Systems*, 27(11), 2703-2722.
10. Z Chen, Z Chi, Y Liand B Vucetic. Error performance of maximal-ratio combining with transmits antenna selection in flat Nakagami-m fading channels. *IEEE Trans. Wireless Commun.* Jan. 2009; 8 (1): 424-431.
11. Z. Chen, J. Yuan, and B. Vucetic . Analysis of transmit antenna selection/maximal-ratio combining in Rayleigh fading channels. *IEEE Trans .Vehicular Technology*. July. 2005; 54(4): 1312–1321.
12. Alam, A. S. S., and GoangSeog, C. Performance of M-QAM, M-DPSK and M-PSK with MRC diversity in a Nakagami-m fading channel. *Journal of Central South University*. 2014; 21(4): 1347-1352.
13. S. Ikki and M. H. Ahmed. Performance analysis of cooperative diversity wireless networks over nakagami - m fading channel. *IEEE Commun. Letters*. April. 2007; 11(4): 334–336.
14. A. Papoulis, *Probability, Random Variables, and Stochastic Process*. McGraw-Hill, 1991.
15. Ali A. Mohammed, Li Yu, and Manar Al-Kali. Performance Analysis of Amplify-and-Forward Cooperative Networks in Non-Identically Distributed Nakagami-m Channels with Best Relaying Selection. *Journal of Communications*. 2015; 10(6): 396-402.
16. I. S. Gradshteyn and I. M. Ryzhik, *Table of Integrals, Series and Products*, 6th ed. New York, NY, USA: Academic Press, 2000.

Index Terms

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Keywords

Cooperative Networks, AF, Maximal ratio combining, Selective Combining, Nakagami -m fading channels