Analisa probabilitas outage pada komunikasi nirkabel dua arah dengan menggunakan sistem full-duplex mimo = Outage probability analysis in bidirectional nirkabel communication using full duplex mimo system

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Abstrak

ABSTRAK
Pada tugas akhir ini, saya menganalisa probabilitas outage dari teknologi full-duplex dengan menggunkan sistem MIMO (2x2) dengan memperhatikan faktor dari self-interference. Faktor self-interference pada tugas akhir ini diasumsikan telah ditekan dengan menggunakan active dan passive cancellation. Diasumsikan kanal yang dilalui sinyal antar 2 node merupakan kanal Rayleigh dan kanal yang dilalui sinyal interferensi merupakan kanal Rician. Selanjutnya, akan diperhatikan nilai dari probabilitas outage akibat dampak dari perubahan faktor K, 𝛾̅ɑ adalah SINR (Signal to Interference plus Noise Ratio), threshold rate (R) dan jumlah antena (N). Pada hasil perhitungan dengan nilai dari K = 35 dB atau lebih serta SINR = 70 dB dan R = 10 bps/Hz, probabilitas outage bernilai lebih dari 10-2 namun, dengan nilai SINR = 70 dB dan R = 10 bps/Hz, probabilitas outage bernilai lebih kecil dari 10-4 untuk nilai K = 15 dB atau kurang, maka didapat bahwa probabilitas outage meningkat jika nilai K meningkat. Selanjutnya, dengan nilai K = 10 dB didapat nilai dari probabilitas outage sebesar 10-4 ketika nilai SINR = 60 dB dan probabilitas outage sebesar 10-6 ketika nilai SINR = 70 dB, maka didapat probabilitas outage menurun jika nilai SINR meningkat. Hasil perhitungan lainnya dengan nilai K = 10 dB, didapat nilai dari probabilitas outage lebih dari 0,2 ketika nilai R = 6 bps/Hz dan probabilitas outage sebesar 0,8 ketika nilai R = 8 bps/Hz, didapatkan Probabilitas outage meningkat jika nilai R meningkat. Selanjutnya, dengan nilai K = 15 dB dan R = 20 bps/Hz, didapatkan nilai probabilitas outage sebesar 0,4, namun ketika nilai dari K = 15 dB dan R = 20 bps/Hz, nilai dari probabilitas outage dibawah 0,1, maka probabilitas outage menurun jika nilai N meningkat.
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ABSTRACT
In this report, I analyze an outage probability in bidirectional nirkabel communication using full-duplex MIMO system with consider effect of self-interference. The self-interference in this report is mitigated by active and passive cancellation, yet there is still interference happens in this system, called residual interference. Assumed, transmit information signal (channel between node-1 and node-2) using Rayleigh fading channel and express interference signal stream using Rician fading channel. I derive a closed-form solution of outage probability towards effect of Rician factor (K), γ̅ɑ is SINR (Signal to Interference plus Noise Ratio), threshold rate (R) and number of antenna (N). With SINR is 70 dB and R is 10 bps/Hz, value of outage probability is more than 10-2, yet with SINR is 70 dB and R is 10 bps/Hz, we get value of probability is below 10-2 for value of K is 15 dB or below, we obtain that value of outage probability increases when we increasing value of K. At value of K is 10 dB, we get outage probability is 10-4 when SINR is 60 dB and outage probability is 10-6 when SINR is 70 dB, from the result we conclude that for certain value of R, as SINR increases outage probability decreases for given K. Furthermore, at value of K is 10 dB, we get outage probability is more than 0.2 when R is 6 bps/Hz and outage probability is

0.8 when R is 8 bps/Hz. We get that as threshold rate increases outage probability increases for given SINR. Moreover, at value of K is 15 dB and R is 20 bps/Hz, we get outage probability is 0.4 but when value of K is 15 dB and R is 20 bps/Hz, we get outage probability is below 0.1. We obtain that increases number of antenna will decreases value of outage probability.