Trade-off Analysis of Energy- and Spectral-Efficiency versus Generated Interference when using Regenerative Relay

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Abstract:

When using a regenerative relay, a trade-off between increasing the energy and spectral efficiency versus reducing the generated interference arises. In this paper, the generated interference in the direct link from the base station to a user terminal is compared with the generated interference from both the base station and the relay node in regenerative relay transmissions. In the space of channel losses, in the transceivers' operating region, the lines corresponding to the generated interference ratio comparing the relay scheme and the direct link are depicted. It is shown that it is possible to tune the energy-efficiency vs. generated interference trade-off, by adjusting the transmit powers, constellation size and coding rate. The trade-off depends on the channel losses along the links.