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Achieving net feedback gain in the linear-deterministic butterfly network with a full-duplex relay. (English) [Zbl 1334.94031](#)

Aydinian, Harout (ed.) et al., Information theory, combinatorics, and search theory. In memory of Rudolf Ahlswede. Berlin: Springer (ISBN 978-3-642-36898-1/pbk). Lecture Notes in Computer Science 7777, 167-208 (2013).

Summary: A symmetric butterfly network (BFN) with a full-duplex relay operating in a bi-directional fashion for feedback is considered. This network is relevant for a variety of wireless networks, including cellular systems dealing with cell-edge users. Upper bounds on the capacity region of the general memoryless BFN with feedback are derived based on cut-set and cooperation arguments and then specialized to the linear deterministic BFN with relay-source feedback. It is shown that the upper bounds are achievable using combinations of the compute-forward strategy and the classical decode-and-forward strategy, thus fully characterizing the capacity region. It is shown that net rate gains are possible in certain parameter regimes.

For the entire collection see [\[Zbl 1259.94005\]](#).

MSC:

[94A05](#) Communication theory

[68M10](#) Network design and communication in computer systems

Keywords:

[butterfly network](#); [interference relay channel with feedback](#); [capacity](#); [inner bound](#); [outer bound](#)

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