



Interference Networks with General Message Sets: A Random Coding Scheme

Reza Khosravi-Farsani, Farokh Marvasti

(Submitted on 10 Jul 2011)

In this paper, the Interference Network with General Message Sets (IN-GMS) is introduced in which several transmitters send messages to several receivers: Each subset of transmitters transmit an individual message to each subset of receivers. For such a general scenario, an achievability scheme is presented using the random coding. This scheme is systematically built based on the capacity achieving scheme for the Multiple Access Channel (MAC) with common message as well as the best known achievability scheme for the Broadcast Channel (BC) with common message. A graphical illustration of the random codebook construction procedure is also provided, by using which the achievability scheme is easily understood. Some benefits of the proposed achievability scheme are described. It is also shown that the resulting rate region is optimal for a class of orthogonal INs-GMS, which yields the capacity region. Finally, it is demonstrated that how this general achievability scheme can be used to derive capacity inner bounds for interference networks with different distribution of messages; in most cases, the proposed achievability scheme leads to the best known capacity inner bound for the underlying channel. Capacity inner bounds can also be derived for new communication scenarios.

Comments: 13 pages, with Appendix, Submitted for Conference Publication

Subjects: **Information Theory (cs.IT)**

Cite as: **arXiv:1107.1839v1 [cs.IT]**

Submission history

From: Reza Khosravi-Farsani [[view email](#)]

[v1] Sun, 10 Jul 2011 07:18:52 GMT (626kb)

[Which authors of this paper are endorsers?](#)

Download:

- [PDF only](#)

Current browse context:

cs.IT

[< prev](#) | [next >](#)

[new](#) | [recent](#) | [1107](#)

Change to browse by:

[cs](#)

[math](#)

References & Citations

- [NASA ADS](#)

DBLP - CS Bibliography

[listing](#) | [bibtex](#)

[Reza Khosravi-Farsani](#)

[Farokh Marvasti](#)

Bookmark([what is this?](#))

