

Polygonal Reliability: the Problem

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Abstract

In this note, the authors look at transmission-reception pairs arranged in a polygon and setup the computation leading to the bidirectional links error exponent.

Consider a hexagon on each of whose vertices there is a (Tx,Rx) pair. Each such pair communicates with the clockwise one step ahead pair via a bidirectional link [1]. Let T_i be the destination-to-source transfer time at node i , inclusive of queuing and decoding times, and let it follow a poisson distribution. Since any pair i can be the clockwise source for a pair j , we want to find out the average reliability function attained by j . The clockwise path lengths leading to node j can be in the set $1, 2, 3, 4, 5$ units. Let $p(i)$ be the probability that node i is a clockwise source for node j . The new expected decoding time will depend upon the old expected decoding time as well as on each of the transfer times. This setup should suffice to estimate a lower bound on the reliability function. Our next steps will be to elaborate on the detailed Tx and Rx timelines. Then we will introduce shortcuts in the polygon. Finally we will look at enlarged versions of the polygon.

References

- [1] Aman Chawla. Reliability of a gaussian channel in the presence of gaussian feedback. *S.M. Thesis*, 2006.