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RESEARCH ARTICLE

Denial of Service Attacks in Wireless Networks: The Case of Jammers

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Abstract

Multiple-path source routing protocols distribute the total traffic among available paths. In this article, we consider the problem of jamming-aware source routing and avoiding jamming by splitting data rate. We formulate this traffic allocation as a lossy network flow optimization problem using portfolio selection theory from financial statistics. We show that in multi-source networks, this centralized optimization problem can be solved using a distributed algorithm based on decomposition in network utility maximization (NUM). We demonstrate the network's ability to estimate the impact of jamming and solve it by redirecting the packets or by splitting data rate. Finally, we efficiently allocate the traffic to maximize the overall throughput.

Keywords: Jamming, Multiple path routing, Portfolio selection theory, Optimization, Network utility maximization.

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