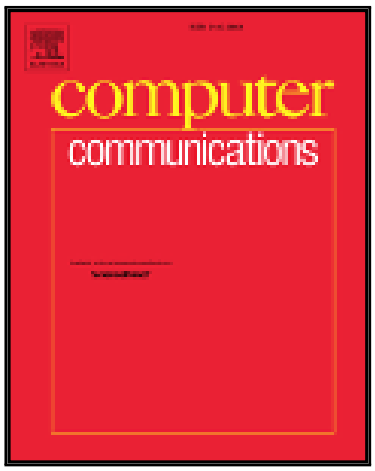

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Traffic Engineering in Cognitive Mesh Networks: Joint Link-Channel Selection and Power Allocation

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Abstract

In this paper, we investigate traffic engineering (TE) methods in Cognitive Radio Wireless Mesh Networks (CR-WMNs) through joint selection of link-channel pairs at each forwarding router and allocating powers on those so as to boost up overall network throughput. We first present an optimization framework, Centralized Optimal Traffic Engineering (COTE), aiming at maximizing aggregated network throughput by selecting optimal set of link-channel pairs, power allocation over those and fair traffic splitting. Further, a centralized Suboptimal Traffic Engineering (SOTE) solution is proposed by employing Lagrangian dual decomposition on the COTE problem, to ensure a resolution in polynomial time. Finally, a Distributed Greedy Traffic Engineering (DGTE) method is proposed to ensure fast convergence to the dynamic changing network behavior and to improve scalability. Extensive simulation results are presented to demonstrate the effectiveness of our proposed TE mechanisms compared to the state-of-the-art works.

Keywords: Traffic Engineering, Throughput Maximization, Link-channel Selection, Power Allocation, MINLP, Lagrangian Dual Decomposition

1. Introduction

Wireless mesh networks (WMNs) have emerged as a cost-effective method of providing Internet access infrastructure and envisioned to expand network coverage in large areas [1]. This opportunity facilitates exponential growth in number

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