ABSTRACT

PHYSICAL LAYER IMPAIRMENT AWARE DYNAMIC LIGHTPATH PROVISIONING IN MIXED LINE RATE WDM NETWORK

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In this study, physical layer impairment aware dynamic lightpath provisioning in mixed line rate WDM networks problem is handled. Along the transparent optical path, a signal undergoes number of physical-layer impairments, and its quality degrades as it travels through several optical components. Mixed line rate refers to an architecture where different line rates on different wavelengths can coexist on the same fiber. We proposed various approaches and algorithms to maximize the number of established connections with requested line rate, while satisfying the given bit error rate for incoming connection, and to avoid disrupting the existing lightpaths. Inverse multiplexing is a technique that tries to transmit the signals with low line rates, where the high line rate is not possible due to impairments. We also propose two novel approaches for IA dynamic lightpath provisioning problem. Fixed Wavelength-Interval Allocation partitions the wavelengths into groups, assigns each group to a different line rate, and establishes lightpaths with different modulation formats over assigned wavelength groups. Weighted-RWA captures the instantaneous state of the network and assigns propagation weight values according to affecting impairments. In the last chapter, we studied launch power determination problem, which tries to keep the impairments minimum and to enable increased lightpath provisioning, and proposed two novel algorithms. All the approaches and algorithms proposed in this thesis are compared with the existing ones, and better results are obtained.

Keywords: WDM Optical networks, Impairment aware dynamic lightpath provisioning, Mixed line rate.
ÖZET

FİZIKSEL KATMAN BOZUCU ETKİLERİ GÖZETİLEREK KARIŞIK VERİ İLETİM HIZLI DALGABOYU BÖLÜMLEMELI ÇOĞULLAMA AĞLARINDA DİNAMİK IŞIKYOLO KURULMASI

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Anahtar Kelimeler: Dalgaboju bölümlemeli çoğullaama optik ağlar, Fiziksel katman bozucu etkileri, Karışık veri iletim hızlı ağlar.