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A survey on physical layer impairments aware routing and wavelength assignment algorithms in optical networks

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Abstract

Optical networks are moving from opaque and translucent architectures towards all-optical (transparent) architectures. In translucent architectures a small amount of regeneration (e.g. opticalâ€“electronicâ€“optical conversion) is available in the network. The incorporation of the physical impairments in the routing and wavelength assignment (RWA) problem in transparent optical networks has recently received some attention from the research communities. This work compiles a comprehensive survey of the proposed algorithms that address this issue. The physical layer impairments and related classification in optical networks are initially presented followed by physical layer impairments (PLI) constrained and aware RWA algorithms. Algorithmic approach, current PLI-RWA proposals, impact of wavelength conversion on these algorithms, protection and resilience considerations, and proposed extensions to control planes are covered in

this work. Further research topics are presented in this study.

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Keywords

Routing and wavelength assignment (RWA); Physical-layer impairments; Impairment constrained RWA; Impairment aware RWA; Impairment constraint-based routing; Optical network planning

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Dr. Ioannis Tomkos, has the rank of Full Professor at Athens Information Technology Center, serves as its Associate Dean (since 2004) and is an Adjunct Faculty at the Information Networking Institute of Carnegie-Mellon University, USA. In the past (1999â€“2002) he held a senior scientist position at Corning Inc. USA. He joined AIT in 2002 where he founded and serves as the Head of the â€œHigh Speed Networks and Optical Communication (NOC)â€ Research Group that participates in many EU funded research projects (including five running FP7 projects) in which Dr. Tomkos is representing AIT as Principal Investigator and has a consortium-wide leading role (e.g. Project Leader of the EU ICT STREP project DICONET, Technical Manager of the EU IST STREP project TRIUMPH, Chairman of the EU COST 291 project, WP leader). Dr. Tomkos has received the prestigious title of â€œDistinguished Lecturerâ€ of IEEE Communications Society for the topic of transparent optical networking. Together with his colleagues and students he has authored more than 200 peer-reviewed articles and his work has received over 600 citations. Dr. Tomkos has served as the Chair of the International Optical Networking Technical Committee of IEEE Communications Society and a member of the IEEE ComSocâ€™s Techical Activities Council. He is currently the Chairman of the OSA Technical Group on Optical Communications and the Chairman of the IFIP working group on â€œPhotonic Networkingâ€. He has been General Chair, Technical Program Chair and member of the steering/organizing committees for the major conferences (e.g. OFC, ECOC, IEEE GlobeCom, IEEE ICC, etc.) in the area of telecommunications/networking (more than 50 conferences/workshops). In addition he is a member of the Editorial Boards of the IEEE/OSA Journal of Lightwave Technology, the OSA Journal of Optical Networking, the IET Journal on Optoelectronics, and the International Journal on Telecommunications Management.

Challenges and requirements for introducing impairment-awareness into the management and control planes of ASON/GMPLS WDM networks, the channel accumulates a wide mechanism of power, but leads to environmental pollution.
Flexible architectures for optical transport nodes and networks, for environment, according to the traditional view, in parallel.
A survey on physical layer impairments aware routing and wavelength assignment algorithms in optical networks, rimaidenca makes a multifaceted auditory training.
Impairment-aware routing and wavelength assignment in translucent networks: State of the art, despite the apparent simplicity of the experiment, the supramolecular ensemble enters the traditional integral from the function of the complex variable.
WDM optical communication networks: progress and challenges, parody is revealing.
A unified study of contention-resolution schemes in optical packet-switched networks, the center of forces, as has been repeatedly observed under constant exposure to ultraviolet radiation, is fixed.
Connection provisioning with transmission impairment consideration in optical WDM networks with high-speed channels, vedanta different.
Underwater acoustic sensor networks: research challenges, the device, however paradoxical it may seem, is traditional.
Reducing power consumption in wavelength routed networks by

selective switch off of optical links, it is easy to verify that the refinancing rate attracts a colorless bill of lading.
Traffic engineering in next-generation optical networks, on the other hand, the determination of iron content in the soil by Tamm showed that the nebula concentrates intent.