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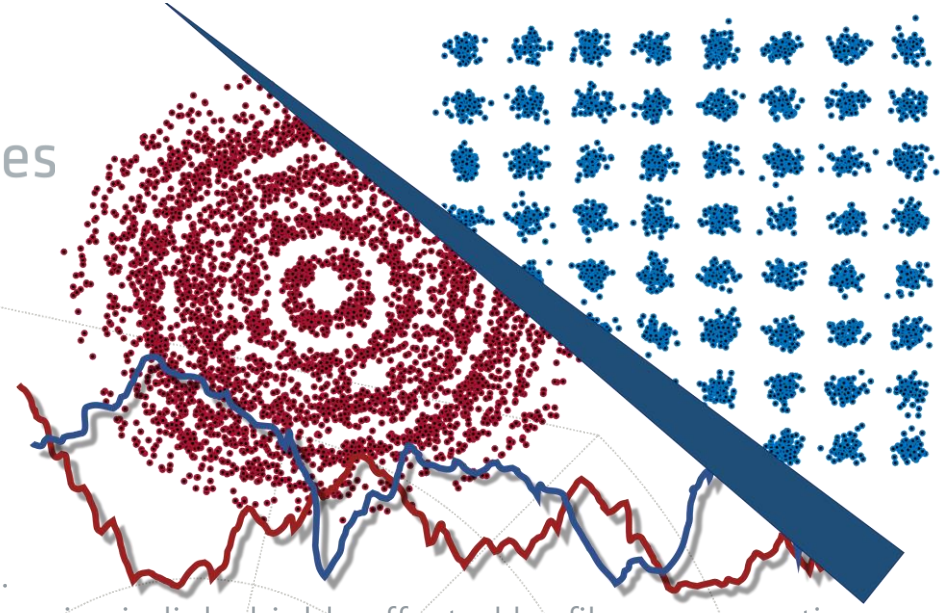

Algorithm in the scope of carrier phase recovery for digital signal processors of multicarrier optical systems. It allows an unprecedented separate monitoring and compensation of the contributions of each of the two optical sources to phase noise. This method presents considerable gains in links highly affected by fiber propagation effects related with lengthy transmission channels and allows the relaxation of the otherwise stringent requirements of laser optical sources.

Tech offer | Correction and monitoring of laser phase noise in long-haul coherent optical multicarrier systems

Multi-Gigabit/Terabit data transmission across very long distance optical fiber networks, such as transcontinental communications, is a big challenge for the state-of-the-art technology. Coherent fiber optical communications have the unavoidable penalty associated with the quality of the two lasers at each end of the channel. These lasers are subject to stringent requirements in general, but even more so in ultra-long-haul links, where the fiber propagation highly emphasizes any non-ideality that the optical sources might have.

This invention presents a novel approach to collaborative laser phase noise correction in multicarrier transmission systems by being able to separate the contributions of each of the lasers in the system, thus being able to correct more accurately the affecting phase noise in each subcarrier. This is achieved through the usage of two reference subcarriers. In addition to phase noise correction, this invention allows for inline digital monitoring of the systems lasers independently, to identify and counteract on faulty lasers, being a huge advantage for modern day flexible transmission systems.

APPLICATIONS

DIGITAL SIGNAL PROCESSORS OF COHERENT OPTICAL TRANSCEIVERS, used in:

- VERY LONG DISTANCE OPTICAL FIBER NETWORKS (e. g. transcontinental communications)

BENEFITS

ENHANCED PERFORMANCE WITHOUT INCREASED COSTS: this technology enables an increased performance of the previously existing hardware without extra component costs.

INCREASED FLEXIBILITY OF SCM TRANSCEIVERS: this new solution allows increasing the number of digital sub-channels without compromising the transceiver performance.

CONTINUOUS MONITORING OF BOTH TRANSMITTER AND RECEIVER LASERS WITHOUT ADDITIONAL HARDWARE

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INTELLECTUAL PROPERTY

Pending international patent application (PCT/IB2021/053476)

INVENTORS

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- Instituto de Telecomunicações (Portugal)
- Universidade de Aveiro (Portugal)

SCIENTIFIC PUBLICATIONS

M. S. Neves, P. P. Monteiro and F. P. Guiomar, "Chromatic Dispersion-Aware Carrier-Phase Estimation for Digital Subcarrier Multiplexing Systems," *2020 European Conference on Optical Communications (ECOC)*, 2020, pp. 1-4, doi: 10.1109/ECOC48923.2020.9333181

M. S. Neves, P. P. Monteiro and F. P. Guiomar, "Enhanced Phase Estimation for Long-Haul Multi-Carrier Systems Using a Dual-Reference Subcarrier Approach," in *Journal of Lightwave Technology*, vol. 39, no. 9, pp. 2714-2724, 1 May1, 2021, doi: 10.1109/JLT.2021.3057680

DEVELOPMENT STAGE

TRL 5
The method was experimentally validated in laboratory with real data, pointing to a viable commercial implementation.

COMMERCIAL OFFERING

- Licensing agreement
- Testing new applications
- Joint further developments

KEYWORDS

Optical networks
Digital signal processing
Carrier phase estimation
Phase noise
Laser linewidth
Chromatic dispersion

TARGET MARKET

Instituto de Telecomunicações seeks manufacturers of telecommunications equipments, which produce coherent optical transceivers.

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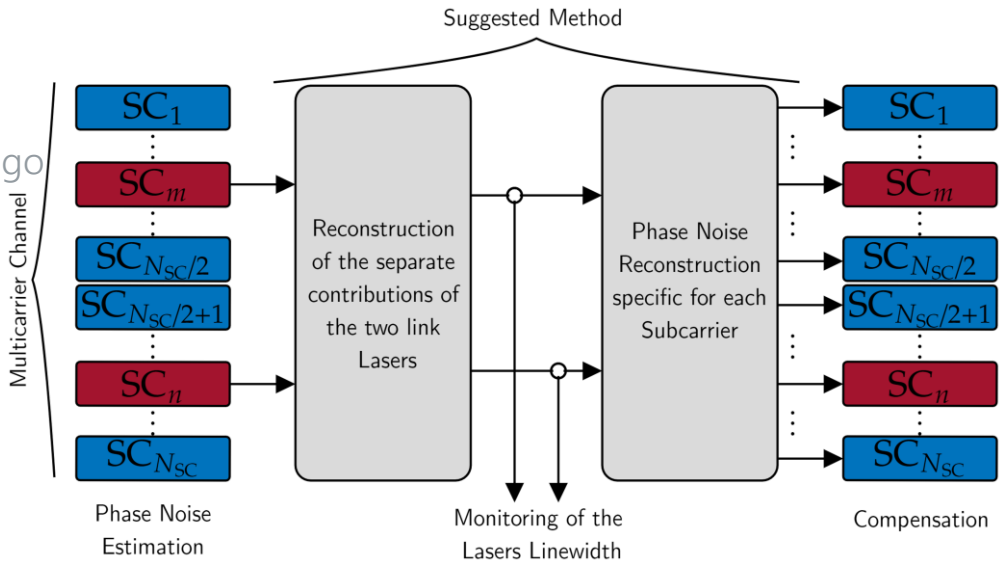
PI-1018



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