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VPItoolkit™ DSP Library Version 3.0

VPIphotonics and Fraunhofer HHI showcase new library of Tx- and Rx-side Digital Signal Processing algorithms for coherent optical transmission systems at ECOC 2017

VPIphotonics announces the new version 3.0 of its best-selling *VPItoolkit™ DSP Library*, which provides access and application support to powerful, lab-proven electronic Digital Signal Processing algorithms, developed by the Photonic Networks and Systems department team of the Fraunhofer Heinrich-Hertz-Institute (HHI). This extensive DSP Library is available as pluggable toolkit to V*PItransmissionMaker™ Optical Systems* and *VPIlabExpert™*.

VPItransmissionMaker Optical Systems is the market-leading simulation platform for optical transmission systems addressing applications from short-reach to ultra-long-haul. Besides accurate simulation of electrical and optical device characteristics and various transmission impairments, this versatile tool offers professional modeling capabilities to support arbitrary 2D, 4D and even N dimensional modulation formats, and bit stream en-/decoding using soft and hard decision FEC codes.

VPIlabExpert delivers a set of interface modules for automatic signal conversion and transfer between simulation software and lab equipment, flexibly allowing user-specific requirements and the addition of new equipment. It provides great potential for reducing efforts in the lab by applying ready-to-use advanced functionalities and virtualizing lab equipment through emulation of optical and electrical components.

By bringing together those powerful methodologies and efficient tools for simulation and the lab, experimentalists are able to significantly accelerate and improve the R&D process, for example, by developing lab-ready DSP solutions or stress-test scenarios using VPIphotonics simulation and analysis tools under practical and real-world conditions.

VPItoolkit DSP Library enables in conjunction a diversity of important transmitter and receiver-side DSP functions for coherent optical systems, including but not limited to non-linear pre-distortion, I/Q imbalance correction, blind CD estimation and compensation, data-aided channel equalization, clock recovery and deskew, carrier frequency and phase recovery, polarization demultiplexing and PMD compensation. Applications include benchmarking of DSP algorithms, offline processing for lab experiments, designing next-generation transceivers, addressing the trade-off between DSP complexity and its performance, comparing modulation formats and analyzing their system performance, and defining component requirements.

The new Version 3.0 features enhanced digital pre-distortion capabilities, allowing the mitigation of linear and nonlinear transmitter component impairments. Building upon the ability to accurately model nonlinear memory effects in performance-critical electronics such as digital-analog-converters (DACs) and modulator driver amplifiers, *VPItoolkit DSP Library* can now be used to automatically synthesize nonlinear pre-distortion filters that overcome these impairments. In consequence, high fidelity signals can be obtained out of imperfect optical transmitters. Moreover, a new 4x4 multiple-input multiple-output (MIMO) adaptive equalizer is introduced to perform additional compensation of I/Q imbalance and skew in received signals.

VPItoolkit DSP Library Version 3.0 is demonstrated at ECOC 2017 in Gothenburg, Sweden, at VPIphotonics booth 334. Further, it is showcased in a live lab demonstration at the Fraunhofer HHI booth 301 featuring HHI's state-of-the-art test and measurement solutions for coherent system development, as well as remote lab automation using *VPIlabExpert*.
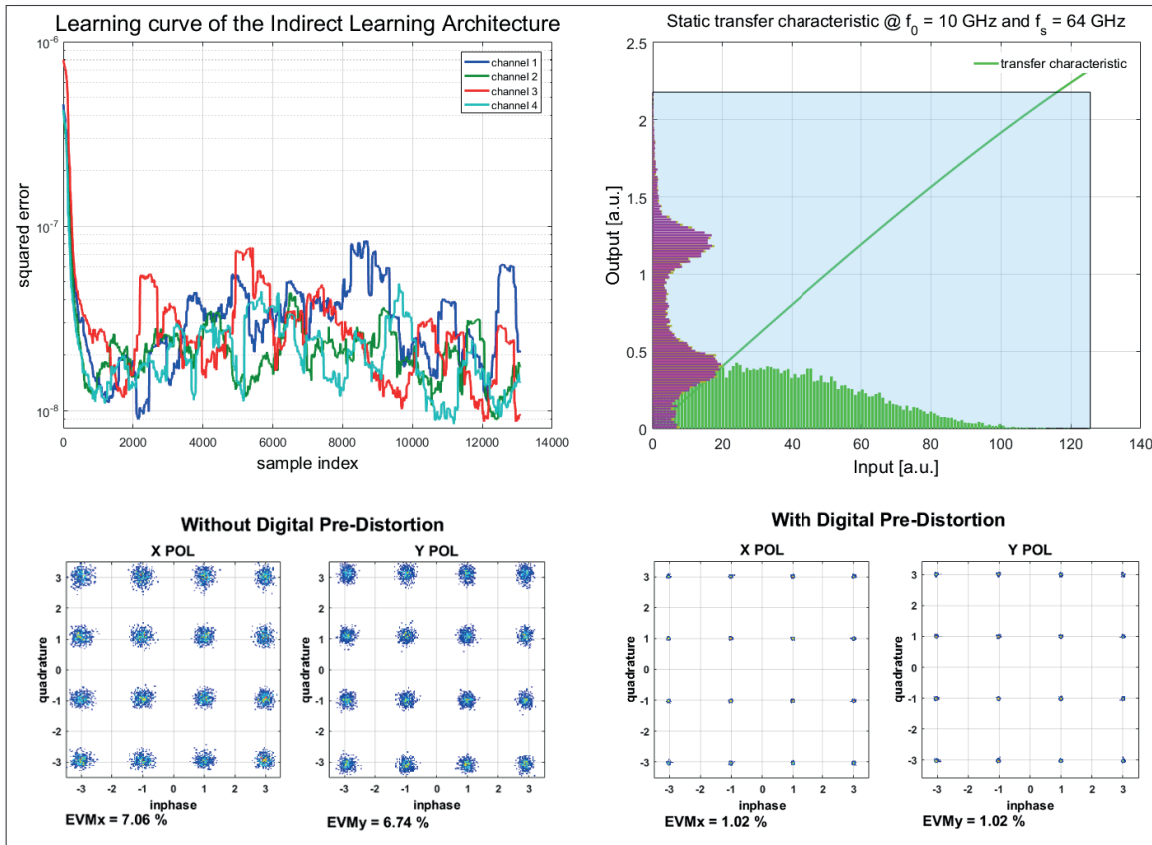
Figure: VPItoolkit DSP Library - Exemplary Results when applying Digital Pre-Distortion

About VPIphotonics

VPIphotonics sets the industry standard for end-to-end photonic design automation comprising design, analysis and optimization of components, systems and networks. We provide professional simulation software addressing demands in integrated photonics and fiber optics, optical transmission links and networks. Our team of experts performs design services addressing customer-specific requirements, and delivers training courses on adequate modeling techniques and advanced software capabilities. Our award-winning off-the-shelf and customized solutions are used extensively in research and development, and by product design and marketing teams at hundreds of corporations worldwide. Over 160 academic institutions joined our University Program enabling students, educators and researchers an easy access to VPIphotonics' latest modeling and design innovations.

For further information, please visit us at www.VPIphotonics.com.