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PTP slave timing accuracy obtained with the assistant of other PTP slaves in the network where the PDV is modeled with the fractional Gaussian noise

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In modern computer networks, time synchronization is critical because every aspect of managing, securing, planning, and debugging a network involves determining when events happen. Time also provides the only frame of reference between all devices on the network. Without synchronized time, accurately correlating log files between these devices is difficult, even impossible. It is needless to point out that with time synchronization, we can distribute frequency via the network which is needed in the telecom industry (it is a requirement from the telco side to allow use of e.g. carrier Ethernet instead of SDH). GPS, NTP (Network Time Protocol) and IEEE1588 v2 Precision Time Protocol (PTP) are the options for time distribution over the network. PTP is designed for local systems requiring accuracies beyond those attainable using NTP. It is also designed for applications that cannot bear the cost of a GPS receiver at each node, or for which GPS signals are inaccessible. The timing accuracy of the PTP algorithm depends strongly on the packet delay variation (PDV) existing in the network. Different paths in the network may lead to lower PDVs thus to improved timing accuracy. In this work, we show the timing performance accuracy of the PTP slave where other PTP slaves (all synchronized to the same master) are assisting to the PTP slave timing synchronization task and where the PDV is modeled with the fractional Gaussian noise (fGn) with a Hurst exponent in the region of $0.5 < H < 1$ corresponding to the case of long-range dependency.

Biography

Monika Pinchas is the Head of Graduate Program at Ariel University of Electrical and Electronic Engineering. Her research interests are in the area of Blind Equalization, Frequency Synchronization in OFDM systems and Network Synchronization. She has published several papers in leading journals and published two books. She served as the CTO at Resolute Networks Ltd.; worked at Tadiran Communication where she was recognized as an expert and; worked for Scitex in the design and implementation of hardware systems.

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