Digital-to-Analog Converter Model for Optical Link Simulations

A method to simulate distortions imposed by DACs in high-speed optical links.

Inventors at Georgia Tech have developed a method to simulate distortions imposed by DACs in high-speed optical links. This method captures the often overlooked phenomenon of the Effective Number of Bits (ENoB) reduction with frequency due to various DAC distortions, primarily jitter. This model for a DAC accurately accounts for the frequency dependent nature of the ENoB and is computationally efficient.

Summary Bullets

- **Efficient**- can simulate frequency dependent effects in a computationally efficient manner

Solution Advantages

- **Efficient**- can simulate frequency dependent effects in a computationally efficient manner

Potential Commercial Applications

- High speed optical links

Background and More Information

Optical links relying on Digital Signal Processing (DSP) techniques continue to push the boundaries of achievable data rates. Higher modulation formats and Nyquist pulse shaping are being widely used to achieve high spectral efficiency. However, these techniques require an increased precision of the transmitted and received waveform. Thus, Digital-to-Analog Converters (DACs) and Analog-to-Digital Converters (ADCs) have become two of the major limiters of the practically achievable performance in an optical link. Performance limiting parameters of these devices include their bandwidth, sampling jitter (resulting from an imperfect clock), and bit resolution.

Inventors

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