



# University of Central Florida

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## Efficient Computation and Compensation of Distortion in Dispersion-Managed Optical Communications

*The cost and time delay of current technologies' computational requirements are now avoidable with this relatively low-cost method of solving nonlinear Schrodinger equations in parallel and in real-time.*

### Introduction

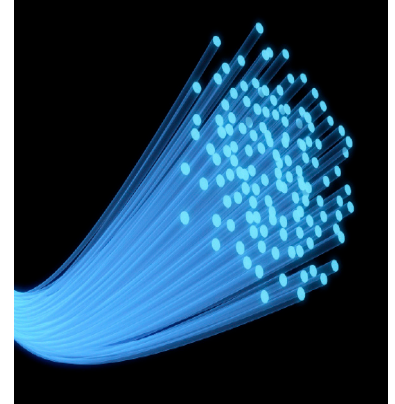
A new method for nonlinearity compensation on a dispersion-managed optical signal, transmitted over a long-haul optical communication link, improves upon current technologies by reducing the computational requirement and increasing computational efficiency by at least an order of magnitude. Implemented using digital signal processing, the current technologies for fiber nonlinearity compensation, including nonlinearity precompensation, digital backward propagation alone, and optical phase conjugation are impractical for high speed fiber links because of the large computational load. The new method enables a reduction in fiber nonlinearity, and consequently an increase in spectral efficiency and transmission distance in fiber communication systems, while reducing the computation needed. Reduced computational load also allows a reduction in ASIC chip size and power consumption by at least an order of magnitude. This technology is ideal for dispersion managed fiber optic transmission systems, particularly long distance (e.g. transoceanic) systems.

### Technical Details

This method of nonlinearity compensation begins with a dispersion-managed optical signal transmitted over an optical communication link and virtually divides the communication link into multiple steps. Next, performing lumped dispersion compensation on a received optical signal obtains a waveform upon which digital backward propagation is applied by performing dispersion compensation and nonlinearity compensation for each of the multiple steps derived from the communication link, generating an estimate of the transmitted signal base.

### UCF Inventors

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### Benefits

- Reduced computational load with equivalent compensation, compared to currently available technologies

### Applications

- Dispersion-managed optical communications, particularly transoceanic systems

### Tech Fields

Communications

### Keywords

long-haul, fiber optics, optical communications, transoceanic, dispersion-managed, digital backward propagation, DBP, nonlinearity compensation, NLC

### US Issued Patent

8,805,209

**If you or your company are interested in this opportunity, Contact:**

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