

Raman amplifier gain adjustment



Overview

We present a gain adaptive tuning method for fiber Raman amplifier (FRA) using two-stage neural networks (NNs) and double weights updates.

Key Takeaways

The utilization of high-gain bandwidth in Fiber Raman Amplifiers (FRA) requires multiple pumps as well as a careful adjustment of their wavelengths and powers. Due to the large number of variable parameters, this is only feasible with the help of special optimization. A Raman amplifier is an optical amplifier based on Raman gain, which results from the effect of stimulated Raman scattering in some Raman gain medium. That medium is often an optical fiber (possibly a highly nonlinear fiber), although it can also be a bulk crystal, a waveguide in a photonic. In this example, we show that the Gain Flattening type of optimization can be used to design multi-wavelength pumped Raman amplifiers with a flattened gain. The method utilizes the areas under the pump power evolution curves along the gain fiber as a criterion and the Newton-Raphson method is used to find the appropriate power combination of the.



Article Content

Gain adaptive tuning method for fiber Raman amplifier based on two ...

We present a gain adaptive tuning method for fiber Raman amplifier (FRA) using two-stage neural networks (NNs) and double weights updates.

(PDF) Gain adjustment of multipump Raman fiber

In this letter, a simple algorithm for the gain spectrum adjustment of backward-pumped distributed fiber Raman amplifier (B-DFRA) is demonstrated

Raman Amplifiers – fiber amplifier, Raman gain, noise

Raman amplifiers are optical amplifiers based on Raman gain. They are often operated with light pulses, although continuous-wave operation is also possible.

Automatic real-time control for gain-flattened fiber Raman amplifiers ...

Abstract An automatic control algorithm for flattening the gain of a fiber Raman amplifier is derived from the Raman scattering equations. A pseudo-inverse gain matrix is introduced to adjust

Optimal Design of Flat-Gain Wide-Band Fiber Raman Amplifiers

The proposed method makes it possible to design multiwave-length pumped Raman amplifiers with the best possible (or very close to that) gain flatness within the specified constraints, such as the number

VPIphotonics – Multipump Raman Amplification

The utilization of high-gain bandwidth in Fiber Raman Amplifiers (FRA) requires multiple pumps as well as a careful adjustment of their wavelengths and powers.

Online versus Offline Optimization Methods for Raman Amplifier

In this work, experimental Raman gain profiles are optimized online using a DE algorithm. During the procedure, the real response of a distributed 50-km standard single-mode fiber (SSMF) RA is

Gain adjustment of multipump Raman fiber amplifier without changing

The method utilizes the areas under the pump power evolution curves along the gain fiber as a criterion and the Newton-Raphson method is used to find the appropriate power combination of

Raman amplification

In-line Raman amplifiers provide distributed gain along the optical fiber, significantly improving the optical signal-to-noise ratio (OSNR) compared to traditional lumped amplifiers like EDFAs, which

Optimizing the pump power and frequencies of Raman

In this example, we show that the Gain Flattening type of optimization can be used to design multi-wavelength pumped Raman amplifiers

Optimal Design of Flat-Gain Wide-Band Fiber Raman Amplifiers

Abstract— We present a novel method for designing multiwave-length pumped fiber Raman amplifiers with optimal gain-flatness and gain-bandwidth performance. We show that by solving the in-verse

A simple algorithm for gain spectrum adjustment of backward-pumped ...

In this letter, a simple algorithm for the gain spectrum adjustment of backward-pumped distributed fiber Raman amplifier (B-DFRA) is demonstrated both theoretically and experimentally. It is shown that

Enhanced gain Raman amplifiers using different pumping schemes

Raman amplifiers (RAs) can be represented as one of the best solutions for transmission techniques, where they can compensate attenuation and transmit the optical signal to long-haul

Semi-Analytic Gain Control Algorithm for the Fiber Raman Amplifier ...

Abstract: A semi-analytic gain-clamping algorithm for the deeply saturated, multi-pump fiber Raman amplifier (FRA) is proposed. Utilizing parameters from the steady state conditions, the gain ...

Backward pumped distributed Raman amplifier: enhanced gain

Abstract The backward Raman amplifier (RA) can be considered as one of the best solutions for optical communication, especially in Wavelength Division Multiplexing technology. They reduce the

Matrix algorithms for dynamic gain-spectrum adjustment of backward ...

Two matrix algorithms aiming at a dynamic gain-spectrum adjustment in a backward-pumped distributed fiber Raman amplifier (B-DFRA) are developed based on the relation between

General and effective dynamic gain spectrum control of broadband raman ...

In this letter, a simple algorithm for the gain spectrum adjustment of backward-pumped distributed fiber Raman amplifier (B-DFRA) is demonstrated both theoretically and experimentally.

Raman Gain – amplification, fiber, amplifier

Raman gain is optical gain arising from stimulated Raman scattering. It is exploited in Raman amplifiers and lasers.

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