FPGA-based fiber optic current sensor

Overview

In this study, we developed an optical fiber sensor by combining: (a) a Michelson interferometer, (b) a micro-electro-mechanical system (MEMS) device, and (c) a field-programmable gate array (FPGA)-based interrogator. Signal processing was integrated into the. This gets even harder when applying such an advanced technology as FPGA, with its benefits of speed and reliability but also caveats like unfamiliar development approaches, integer math and even hours of compilation time. We managed to bypass the complexity of tools by using LabVIEW FPGA and. This paper proposes an optical fiber sensor signal monitoring system based on FPGA to solve the problems such as the phase adjustment accuracy of optical fiber sensor. The out-cavity. The FOCS Series Fiber Optical Current Sensors are passive, all-dielectric devices designed for precise current measurement without metal components, making them immune to electromagnetic interference noise. They measure current using light that passes through a Faraday fiber and reflects back from. With an FPGA sensor module, existing fiber optic communications lines can pull double duty as environmental monitoring sensors.

Article Content

High sensitivity fiber optic current sensor based on recirculating ...

We propose high sensitivity fiber optic current sensor based on recirculating fiber loop architecture. We experimentally achieved a sensitivity of 11.5 degrees per ampere and a resolution of 10 mA using

Optical Fiber Current Sensor

The FOCS Series Fiber Optical Current Sensors are passive, all-dielectric devices designed for precise current measurement without metal components, making them immune to electromagnetic

Design of a current sensor based on optical fibers

This paper present the design of a current sensor based on Faraday Effect using optical fibers devices and a polarizing beam splitter (PBS). Two different schematics are to be taken into account, for high

Fiber-Optic Current Sensor for the Electro-Chemical Industry

Abstract fiber-optic current sensor for direct currents up to 500 kA is presented. Applications include the control of the electrolysis process for the production of metals such as aluminium, copper,

CPU-Based FPGA Algorithm Model of Fiber Optic Current Sensor ...

The article describes an approach for simulating the fiber optic electric field sensor with a sensitive element operating on the Pockels effect arising in an optical waveguide recorded in a lithium

Fiber-Optic Current Sensor Based on Ohmic Heating of a Silicon

A fiber-optic Fabry-Perot interferometer (FPI) is proposed and demonstrated as an electric current sensor based on ohmic heating with temperature self-compensation.

Improvement of Fiber-Optic Current Sensor Technology

The article is focused on the fiber optic current meter with FPGA-based data processing. The sensor element operation is based on the Faraday

FPGA-Based High-Speed Optical Fiber Sensor Based

In this paper, a fiber-optic sensor based on Brillouin optical correlation-domain reflectometry (BOCDR) with a high repetition rate and real

(PDF) FBG-based fibre-optic current sensors for power systems ...

Architecture of the hybrid voltage sensor element, comprising an FBG bonded to a stack of piezoelectric elements. CT-based optical current sensor for use with fibre Bragg grating interrogation

Optical Magnetostrictive Current Sensor Based on In-Fiber

In this article, a compact fiber-optic current sensor (FOCS) based on an in-fiber Fabry–Pérot interferometer (FPI) and a magnetostrictive transducer is presented.

Development of a Fiber Optic Current Sensor for Low DC

Preserving the stable operation and proper functionality of the electric power grid is of utmost importance. Integral grid components such as power transformers are negatively affected by

Fiber Optic Current Meter for IIoT in Power Grid

The article is focused on the fiber optic current meter with FPGA-based data processing. The sensor element operation is based on the Faraday effect which occurs in the Spun optical fiber twisted

IEEE TRANSACTIONS ON INSTRUMENTATION AND

FPGA-Based High-Speed Optical Fiber Sensor Based on Multitone-Mixing Interferometry Javier Elaskar, Marcelo A. Luda, Lorenzo Tozzetti, Jorge Codnia, and Claudio J. Oton

Fiber Optic Sensing Signal Monitoring System Based on FPGA

This paper proposes an optical fiber sensor signal monitoring system based on FPGA to solve the problems such as the phase adjustment accuracy of optical fiber sensor.

Fiber Optic Sensors: Current Status and Future

Another important topic is the resonances generated when using thin films in conjunction with optical fibers, and the enormous potential of sensors based on

CPU-Based FPGA Algorithm Model of Fiber Optic Current Sensor ...

We managed to bypass the complexity of tools by using LabVIEW FPGA and National Instruments hardware platform to rapidly implement control and demodulation functionality into a

FPGA-Based Hardware Implementation of Homodyne

In this study, we developed an optical fiber sensor by combining: (a) a Michelson interferometer, (b) a micro-electro-mechanical system (MEMS)

Fiber-Optic Sensor for MA Current Measuring

A fiber-optic current sensor implementing the differential measurement to measure currents up to tens of megaamperes is proposed. The sensor is based on a reflective interferometer with a sensing coil

FPGA-Based High-Speed Optical Fiber Sensor Based on Multitone

We report a real-time high-speed fiber Bragg grating (FBG) interrogator based on a fiber-optic interferometer. The signal processing is performed by using a low-cost fieldprogrammable gate array

Closed-Loop Resonant Fiber Optic Current Sensor Based on

Long-term current monitoring with low noise is essential for smart energy. This paper introduces a resonant fiber optic current sensor utilizing a broadband source and linear cavity. The

A Fiber-Optic Current Sensor Based on Fuzzy PI Control

A highly accurate fiber-optic current sensor for direct currents up to 500 kA is presented. Applications include the control of the electrolysis process for the production of metals such as ...

FPGA-based interrogation controller with optimized pipeline ...

Fiber-optic sensor arrays are always organized utilizing hybrid time division multiplexing (TDM)/wavelength division multiplexing (WDM) techniques to share some common optical

Fiber optic current sensor with a tunable Faraday rotator for pulsed ...

Polarization closed-loop fiber-optic current sensing is demonstrated for pulsed-power current metrology. A Bi-substituted Faraday rotator maintains the operating point near 45 ∘, and an FPGA implements

FPGA-Based High-Speed Optical Fiber Sensor Based on Multitone

We report a real-time high-speed fiber Bragg grating (FBG) interrogator based on a fiber-optic interferometer.

Optical fiber current sensor research: review and outlook

Optical fiber current sensor (OFCS) based on Faraday magneto-optic effect has many advantages of immunity against electromagnetic interference, high sensitivity and wide dynamic range.

A Fiber-Optic Current Sensor Based on Fuzzy PI Control

Traditional current sensors already can not meet these needs of grid metering and protection. This paper proposes a fiber-optic current sensor (FOCS) based on fuzzy PI control strategy which

(PDF) Fiber-Optic Current Sensor Based on FBG and

PDF | This paper presents the design, fabrication, and characterization of two compact fiber-optic current sensors (FOCS) based on

FPGA-Based Processor Turns Existing Optical Fibers

A team of researchers, led by Nokia Bell Labs, has demonstrated how a simple optical fiber can be turned into a functional sensor — monitoring both the health

Modulation-free broadband fiber optic current sensor

A modulation-free, low-cost fiber optic current sensor based on a broadband source and a single-mode linear resonant cavity is presented. The

CPU-Based FPGA Algorithm Model of Fiber Optic Current Sensor ...

Our model makes it easy to reconfigure the optical scheme of the current sensor to explore implementations of different configurations.

Contact Us

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