

Hysteresis Error in Fiber Optic Sensor Experiments



Overview

This guide explains how hysteresis in sensors creates offset and delayed responses that degrade accuracy and long-term stability, and shows you how to identify and mitigate its effects. This paper introduces a novel approach that employs a backpropagation (BP) neural network to address the hysteresis nonlinearity in conductive fiber-based tactile sensors. To assess the effectiveness of the proposed method, four sensor units were designed. Hysteresis can cause systematic measurement errors and, in safety-critical systems, dangerous false readings, yet. Hysteresis is a fundamental concept in the field of sensor technology, referring to the phenomenon where the output of a sensor depends not only on the current input but also on the previous inputs or the history of the input. In other words, the sensor's response to a given stimulus is influenced.



Article Content

Hysteresis

Hysteresis is a common term used in the automation industry when referring to sensors that detect objects or measure

National Center for Biotechnology Information

Hier sollte eine Beschreibung angezeigt werden, diese Seite lässt dies jedoch nicht zu.

How Hysteresis Affects Sensor Accuracy and Stability

This guide explains how hysteresis in sensors creates offset and delayed responses that degrade accuracy and long

Hysteresis errors of commonly used sensor materials

In this study, the hysteresis errors of 17-4 PH precipitation hardened stainless steel, aged Cu-Be (copper beryllium)

Hysteresis compensation technique applied to polymer optical fiber ...

However, high hysteresis can occur in POF curvature sensors due to the polymer viscoelastic response. In order to

Hysteresis compensation in temperature response of fiber Bragg

In this study, we take a physics-informed approach to modeling hysteresis induced changes in the temperature

Compensation of hysteresis in magnetic field sensors employing Fiber ...

Abstract The paper proposes a novel magnetic field sensor where a technique for hysteresis compensation is

Fiber-Optic Microbend Sensor Study | PDF | Optical Fiber | Hysteresis

This document describes an experiment on studying the effect of microbending on light attenuation in multi-mode optical fibers. It

Improved method of hysteresis compensation for a piezoelectric fiber ...

We report on an improved numerical method for hysteresis compensation within a hybrid piezoelectric fiber optic voltage sensor. The

A novel fiber sensor for cumulative bending measurement applied to ...

In this paper, a novel fiber sensor capable of cumulative bending angle measurement is proposed, and its application

Hysteresis compensation for a piezoelectric fiber optic voltage sensor

Optical Engineering is an SPIE journal that publishes peer-reviewed articles reporting on research, development, and applications of

Evaluating Hysteresis and Time-Response in Palladium Nanoparticle

Abstract: In this study, we proposed a hetero-core optical fiber hydrogen sensor composed of alternating layers of PLL and PdNPs

Sensor hysteresis curve for fiber orientation angle of $h = 50^\circ$...

Download scientific diagram | Sensor hysteresis curve for fiber orientation angle of $h = 50^\circ$ showing Bragg wavelength shift for the

Hysteresis

Hysteresis is often caused by mechanical, electrical, or physical characteristics of the sensor and its components. It can affect the

Hysteresis Error of Fiber Optic Sensor

We present details of numerical techniques developed to compensate the effects of hysteresis experienced by a hybrid piezoelectric

Reducing Hysteresis Errors in Polymer-Based Force Sensors

In conclusion, addressing hysteresis in polymer-based force sensors requires a multifaceted approach involving

Hysteresis compensation technique applied to polymer optical fiber ...

Abstract Polymer optical fiber (POF) curvature sensors present some advantages over conventional techniques for angle

Hysteresis Error of Fiber Optic Sensor

This guide explains how hysteresis in sensors creates offset and delayed responses that degrade accuracy and long-term stability,

Hysteresis in optical sensing and its impact on the analytical error of ...

Various types of errors during the measurements of ion-selective electrodes, ion-sensitive field effect transistors, and

Hysteresis of the pressure sensor

The sensor used in that study was a ferrule based, single mode fibre optic Fabry-Perot pressure sensor. The application area for this

Hysteresis errors of commonly used sensor materials

The results showed that the hysteresis characteristics can be improved by the application of suitable thermo-mechanical

Fiber-Optic Microbend Sensor Study | PDF | Optical Fiber | Hysteresis

Fiber-Optic Microbend Sensor Study This document describes an experiment on studying the effect of microbending on light

Linearity and hysteresis of the optical sensor. Black squares and red ...

Linearity and hysteresis of the optical sensor. Black squares and red circles are the measurement data from the sensor when the

Understanding Hysteresis in Sensors

Explore the concept of hysteresis in sensors, its causes, and its impact on measurement accuracy and reliability.

Fiber-Optic Shape Sensing With Nonlinear Twist Compensation Using

Although it has been demonstrated that the helical multicore fiber (HMCF) is applicable for accurate shape sensing,

Modified Nonlinear Hysteresis Approach for a Tactile

This paper introduces a novel approach that employs a backpropagation (BP) neural

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