# FM01

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FM01-13

## A Study on Wire Rope Flaws Signal Processing using Discrete Wavelet Transform

Jeong Tak Min, Jin Woo Lee, Kwon Soon Lee(Dong-A Univ., KOREA)

●Abstract
●Introduction
●Wire Rope Detecting System
●Signal Processing
●Experiment
●Conclusion
●Reference

FM01-14

## Fault Detection of an Intelligent Cantilever Beam with Piezoelectric Materials

Tae-Kyu Kwon, Suk-Jeong Lim, Kee-Ho Yu, Seong-Cheol Lee(Chonbuk Univ., KOREA)

A method for the non-destructive detection of damage using parameterized partial differential equations and Galerkin approximation techniques is presented. This method provides the theoretical and experimental verification of a non-destructive time domain approach to examine structural damage in smart structure. The time histories of the vibration response of structure were used to identify the presence of damage. Damage in a structure causes changes in the physical coefficients of mass density, elastic modulus and damping coefficient. This paper examines the beam-like structures with PVDF sensor and PZT actuator to perform identification of those physical parameters and to detect the ...

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FM01-15

## Vibration Measurements of an Intelligent Cantilever Beam in Contact with Fluid

Tae-Kyu Kwon, Seong-Hwa Choi, Gye-Hyoung Yu, Seong-Cheol Lee(Chonbuk Univ., KOREA)

This paper presents the vibration characteristics of an intelligent cantilever beam in contact with a fluid using a PZT actuator and PVDF film. The dynamic behaviors of a flexible beam-water interaction system are examined. The effect of the liquid level on free vibration of the composite beam in a partially liquid-filled circular cylinder is investigated. The coupled system is subject to an undisturbed boundary condition in the fluid domain.

It was found that the coupled natural frequencies decreased with the fluid level for the identical composite beam due to added mass effect. In case of the free-free boundary condition, the natural frequency gently decreased at fluid water level betw...

FM01-16

## Pose Estimation of an Object from X-ray Images Based on Principal Axis Analysis

Young Jun Roh, Hyung Suck Cho(KAIST, KOREA)

1. Introduction
Pose estimation of a three dimensional object has been studied in robot vision area, and it is needed in a number of industrial applications such as process monitoring and control, assembly and PCB inspection.
In this research, we propose a new pose estimation method based on principal axes analysis. Here, it is assumed that the locations of x-ray source and the image plane are predetermined and the object geometry is known. To this end, we define a dispersion matrix of an object, which is a discrete form of inertia matrix of the object. It can be determined here from a set of x-ray images, at least three images are required. Then, the pose information is obtained fro...

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FM01-17

## A neural network based sensor modeling for 6-DOF motions of objects

Won Shik Park, Hyungsuck Cho(KAIST, KOREA)

A sensor modeling via artificial neural network is presented in this paper. The optical sensor has been designed to measure absolute 3-dimensional positions and orientations of objects in 6-DOF. The method utilizes a triangular pyramidal mirror having an equilateral cross-sectional shape referred as 3-facet mirror. The mirror has three lateral reflective surfaces inclined 45 degrees to its bottom surface. The 3-facet mirror is mounted on the object whose 6-DOF motion is to be measured. As optical components, a He-Ne laser source and three position-sensitive detectors(PSD) are used. The laser beam is emitted from the He-Ne laser source located at the upright position and vertically incident o...
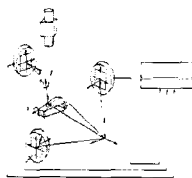


FM01-18

## Development of Flexible Tactile Sensor Array

Hyungtae Kim, Kwangmok Jung, Kyungsub Lee, Jaedo Nam, Hyoukryeol Choi(Sungkyunkwan Univ., KOREA)

In this paper, we present an arrayed flexible tactile sensor, which can detect contact normal forces as well as positions. The tactile sensor is developed using Polyvinylidene Fluoride (PVDF) that is known as piezoelectric polymer, and the surface electrode is fabricated using silk-screening technique with silver. We develop a charge amplifier in order to amplify the small signal from the sensor, and a fast signal processing unit by using a DSP chip. The developed tactile sensor is physically flexible and it can be deformed three-dimensionally to any shape so that it can be placed on anywhere on the curved surface. In the future, the developed sensor is applied to a dexterous robotic hand...
●Tactile sensing, PVDF, Robot hand