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Broadband Distributed-Mass Micromachined Gyroscope

Tech ID: 18859 / UC Case 2003-451-0

TECHNOLOGY DESCRIPTION

University researchers have invented a distributed-mass micromachined gyroscope which minimizes quadrature error, eliminates effects of directional residual stresses, and completely decouples the drive and sense modes. The device has multiple drive-mode oscillators, distributed symmetrically around the center of a supporting frame. The multi-directional linear drive-mode and the rotational sense-mode allows complete decoupling of the drive and sense direction oscillations, minimizing instability and zero-rate drift due to dynamical coupling between the drive and sense modes. Due to the radial symmetry, the drive forces applied to the drive-mode oscillators cancel out in all directions, and the quadrature error is effectively nullified. The effects of directional residual stresses are also eliminated, due to the multi-directional and symmetric nature of the drive-mode oscillators. The device also provides a wide-bandwidth operation region in the drive-mode frequency response. By designing each drive-mode oscillator to have incrementally spaced resonance frequencies, the total Coriolis torque is set at a constant value over a wide range of driving frequency. If the sense-mode resonance frequency is designed to be accommodated in the same frequency band, robustness and insensitivity to parameter fluctuations is achieved.

APPLICATIONS

This design has potentially wide applications including high performance navigation and guidance systems, automotive safety systems like yaw and tilt control, roll-over protection and next generation air bag and antilock braking systems, and consumer electronics such as image stabilization in video cameras.

PATENT STATUS

Country	Туре	Number	Dated	Case
United States Of America	Issued Patent	7,100,446	09/05/2006	2003-451

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