

SELF CALIBRATION FOR ANGULAR RATE ESTIMATION FOR AXISYMMETRIC CORIOLIS VIBRATING GYROSCOPES

Abstract

An axisymmetric Coriolis vibrating gyroscope includes a resonator, control elements and control circuitry. The control elements maintain vibration in the resonator by applying forces to the resonator and/or sense resonator vibrations around the resonator's axis of symmetry. The control circuitry positions the resonators' angular direction of vibration at initial angles on the perimeter of the resonator element and allows the vibration to precess for respective time periods. Respective angular directions of the vibration at a multiple sampling times during the time period are calculated based on control elements readings at the sampling times. Respective linear coefficients of a polynomial fitting the angular directions are determined. Fourier coefficients of an angle-dependent bias of the Coriolis vibrating gyroscope are determined from the respective linear coefficients, such that a bias of a measured angular rate of vibration may be corrected using the determined Fourier coefficients.

[Figure 3]