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EXTENDED KALMAN FILTER APPLICATION FOR INERTIAL SENSORS CALIBRATION

Large amount of works are sanctified to problem of sensor's calibration in modern literature. These works use determined signal model and doesn't take into account stochastic characteristics. In this article it is suggested to use stochastic signal's characteristics for improvement calibration process. Noise composition is determined by means of Allan variation. The estimated noise sources are included into the Kalman filter using form filter. In order that to form this model, the different types of noise must be expressed in form of differential equations. Used stochastic models of signal noise constituents (quantization noise, random walk, flicker noise, ramp noise, white noise) are shown in the article. Detailed algorithm of optimal Kalman filtration is described for inertial sensors calibration. The extended Kalman filter was applied for calibration accelerometer's block; it gave winning in convergence speed of calibration coefficients, with an absolute error at the level of ADC noises.

Keywords: *calibration, Allan variance, the Kalman filter, the inertial sensor.*