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## ABSTRACTS

### *IMU Accelerometer Calibration for Pole Tilt Compensation*

**Tomas Thalmann, Hans Neuner(Austria)**

Keywords: Accelerometer, Calibration, Model Estimation, Sensitivity Analysis, Leveling

#### Abstract

IMUs (Inertial Measurement Units) are widely used in many robotics applications. Proper calibration is inevitable to ensure usable results in sensor fusion and/or other estimation methods. Numerous sensor models for IMUs can be found in literature. These are investigated from two point of views: How well can these parameters be determined? And how does they influence tilt/inclination estimation with IMUs.

In the first part several sensor models differing in the number of calibration parameters are analyzed in a simulation environment. We investigate two calibration methods: a) multi-position gravity-based calibration method without the need of external equipment, and b) a calibration routine aided by an industrial robot.

In the second part the influence of these calibration parameters on tilt estimation is examined. The well-known leveling equations using accelerometer measurements of gravity for inclination angles determination are used. This method is analyzed using variance based sensitivity analysis to identify important input parameters and to optimize the model/system.