

Abstract

Imprecision of sensor measurements due to systematic and nonsystematic errors can give rise to severe problems in several autonomous navigation tasks. In particular, the errors due to sensor bias can render existing Simultaneous Localization and Map Building (SLAM) algorithms useless as such biases cause the estimators to diverge. This paper describes a method to estimate and compensate these ever present and much cumbersome sensor and input biases in real time in the context of SLAM applications without an a priori map of the environment. The validity of the proposed methodology is verified via simulations for the case of an autonomous land vehicle navigating in a completely unknown 2D terrain. It is assumed that biased and noisy range and bearing measurements to point landmarks are obtainable in real-time, using a sensor such as a laser scanner.