On the Kalman Filter Approach for Localization of Mobile Robots

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Abstract. In this work we analyze robot motion given from the UTIAS Multi-Robot Dataset. The dataset contains recordings of robots wandering in a confined environment with randomly spaced static landmarks. After some preprocessing of the data, an algorithm based on the Extended Kalman Filter is developed to determine the positions of robots at every instant of time using the positions of the landmarks. The algorithm takes into account the asynchronous time steps and the sparse measurement data to develop its estimates. These estimates are then compared with the groundtruth data provided in the same dataset. Furthermore several methods of noise estimation are tested, which improve the error of the estimate for some robots.

Keywords: robot localization · Extended Kalman Filter · noise estimation · real-world data