Project proposal

Title: Kalman Filter for Rover localisation
Supervisor: Prof. Ferrari Trecate Giancarlo
Timeframe: Spring 2021

EPFL Xplore is an interdisciplinary project whose aim is to design and develop a Rover to participate in two international competitions: the University Rover Challenge and the European Rover Challenge. The Rover needs to navigate autonomously from different using software developed by students.

Project description

Problematic
We need to know the position of the Rover at all times. We are currently using a Kalman filter from ROS directly, but we are looking for a personalized Kalman for our Rover.

1) familiarizing with the nonlinear state-space model of the rover and sensors
2) simulation on the model of the rover
3) development of EKF (extended Kalman filter) - tuning of the covariances
4) validation of EKF through simulations and analysis of residuals
5) implementation of alternatives for comparison

It is also asked to develop a plugin for ROS in order to interface the Kalman with the Rover.

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