

عنوان مقاله:

Locating Mobile Robot at the Presence of Color Noise Based On Fuzzy and Extended Kalman Filter with Various approximations of Process Noise Covariance Matrix

محل انتشار:

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نویسنده:

Hamed Aghili - Department of Computer and Information technology (Robotic engineering), Payame Noor University (PNU)

خلاصه مقاله:

In the present paper, we proposed to employ fuzzy logic and extended Kalman Filter with various approximations of process noise matrix to optimally locate mobile robot at the presence of unknown color noise in system equations and observations vector. Possessing systematic equations of the mobile robot, observations vector is obtained. For simultaneous localization of the mobile robot, it is firstly assumed that state and observations equations are contaminated with white uncorrelated noise with the mean of zero and certain variance. Then, assuming that these white noises have passed through second-order filters, mobile robot localization problem is formulated through considering the resulted color noises. To this end, Extended Kalman Filter has been used to propose localization problem. To implement the mentioned algorithm, process noise covariance matrix can be estimated using various methods (four methods have been employed in the research). On one hand, supposing that there is not so much information regarding process noise covariance matrix, fuzzy logic has been presented to estimate process noise covariance. Based on information received from innovation vector, variance is updated. The results obtained from simulation have been presented in low, average and high variances for all the four employed methods and the proposed localization performance has been investigated based on estimation accuracy.

کلمات کلیدی:

mobile robot, extended Kalman Filter, colored noise, fuzzy logic, process noise covariance matrix

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