State prediction

What we need for the state prediction, is the predictive pdf (for one step and without control, for brevity)

$$f\left(x_{t+1}|y\left(t\right)\right)=\int_{x_t^*}f\left(x_{t+1},x_t|y\left(t\right)\right)dx_t=$$

$$=\int_{x_t^*}\underbrace{f\left(x_{t+1}|x_t\right)}_{\text{state model}}f\left(x_t|y\left(t\right)\right)dx_t$$

where the first pdf under the integral is the predictive model of the state and the rest is realized recursively by the Kalman filter

$$f\left(x_t|y\left(t\right)\right)\propto f\left(y_t|x_t\right)\int_{x_{t-1}^*}f\left(x_t|x_{t-1}\right)f\left(x_{t-1}|y_{t-1}\right)dx_{t-1}$$

Program and its description

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