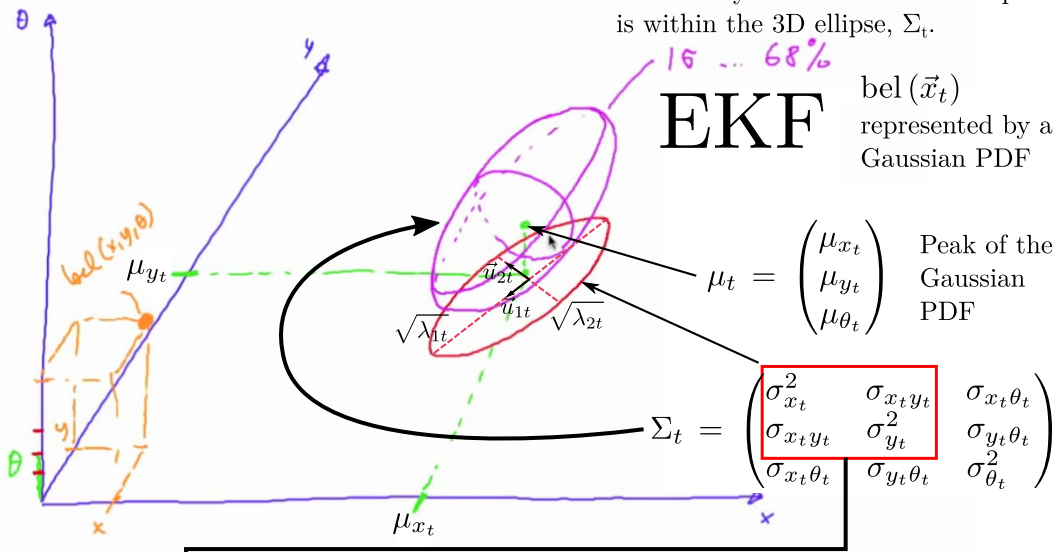


Probability that the robot's real pose is within the 3D ellipse, Σ_t .

EKF

$\text{bel}(\vec{x}_t)$
represented by a
Gaussian PDF



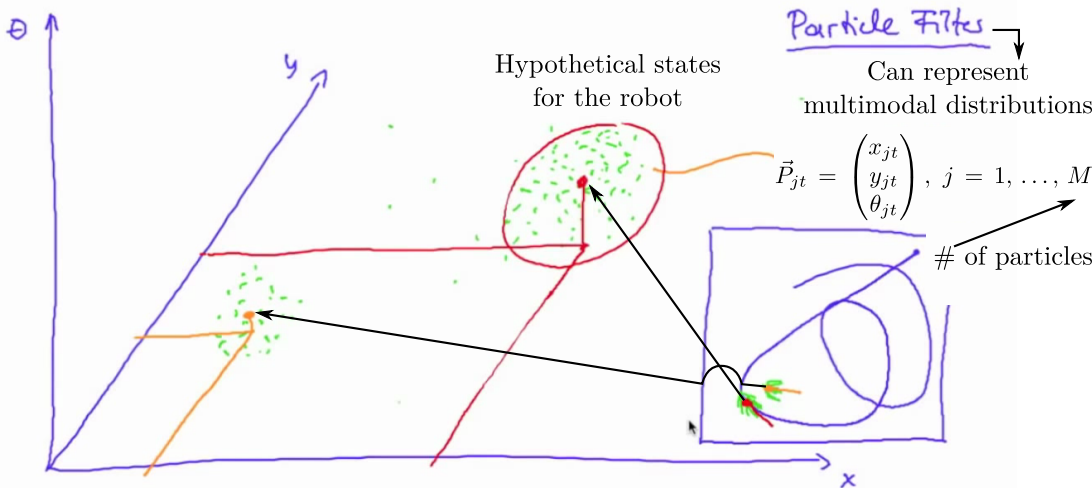
3D space of all possible states

$$\begin{pmatrix} \sigma_{x_t}^2 & \sigma_{x_t y_t} \\ \sigma_{x_t y_t} & \sigma_{y_t}^2 \end{pmatrix} = U \cdot D \cdot U^T$$

$$= (\vec{u}_{1t}, \vec{u}_{2t}) \cdot \begin{pmatrix} \lambda_{1t} & 0 \\ 0 & \lambda_{2t} \end{pmatrix} \cdot \begin{pmatrix} \vec{u}_{1t}^T \\ \vec{u}_{2t}^T \end{pmatrix}$$

Eigenvectors
(Ellipse axes' directions)

Eigenvalues



The landmarks' positions were given in advanced in the EKF lecture and in the PF lecture, and also they were fixed values.