

Aufgabe 3

$$\begin{aligned}
 f(x_t, u) &= x_t + R_{\theta_t} u = \begin{pmatrix} x_t \\ z_t \\ \theta_t \end{pmatrix} + \begin{pmatrix} \cos \theta_t & \sin \theta_t & 0 \\ -\sin \theta_t & \cos \theta_t & 0 \\ 0 & 0 & 1 \end{pmatrix} \begin{pmatrix} \Delta x_{odo} \\ \Delta z_{odo} \\ \Delta \theta_{imu} \end{pmatrix} \\
 &= \begin{pmatrix} x_t + \cos \theta_t \Delta x_{odo} + \sin \theta_t \Delta z_{odo} \\ z_t + \sin \theta_t \Delta x_{odo} + \cos \theta_t \Delta z_{odo} \\ \theta_t + \Delta \theta_{imu} \end{pmatrix}
 \end{aligned}$$

$$h(x_{t+1}) = \begin{pmatrix} \bar{x}_{t+1} \\ \bar{z}_{t+1} \\ \bar{\theta}_{t+1} \end{pmatrix}$$

$$\mathbf{F}_{t+1} = \begin{pmatrix} 1 & 0 & -\sin \theta_t & \Delta x_{odo} + \Delta z_{odo} \cos \theta_t \\ 0 & 1 & -\cos \theta_t & \Delta x_{odo} - \Delta z_{odo} \sin \theta_t \\ 0 & 0 & 1 & 0 \end{pmatrix}$$

$$\mathbf{H}_{t+1} = \begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$$