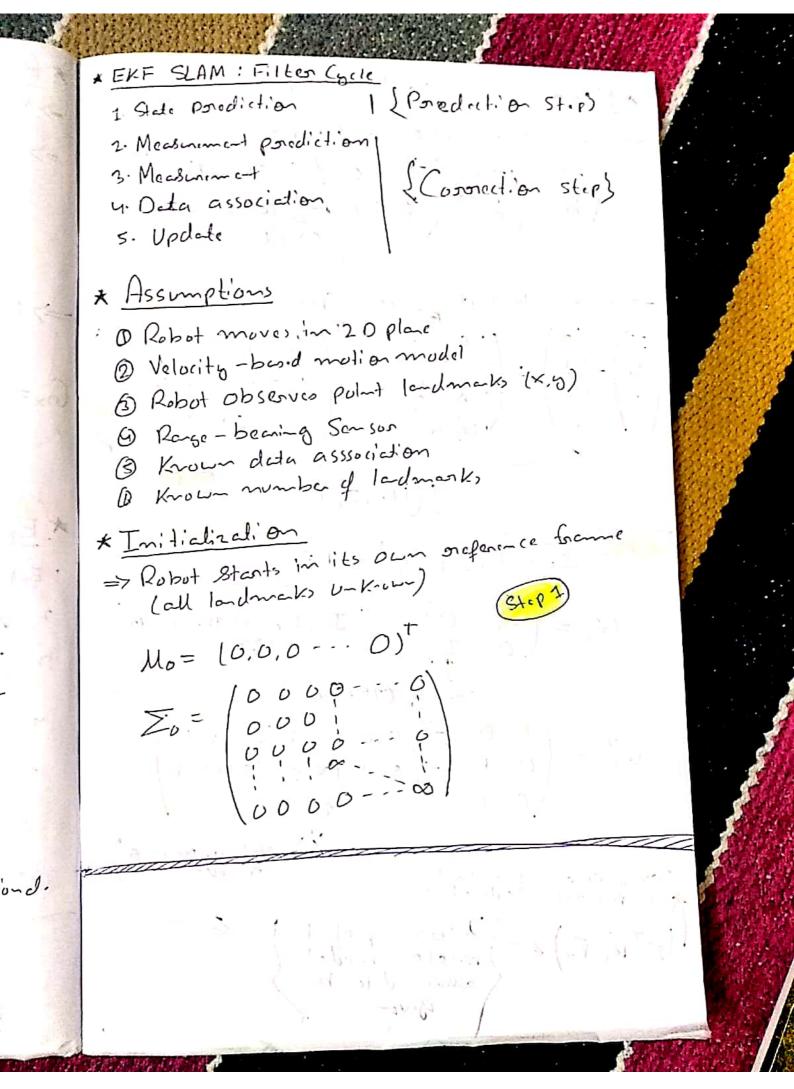
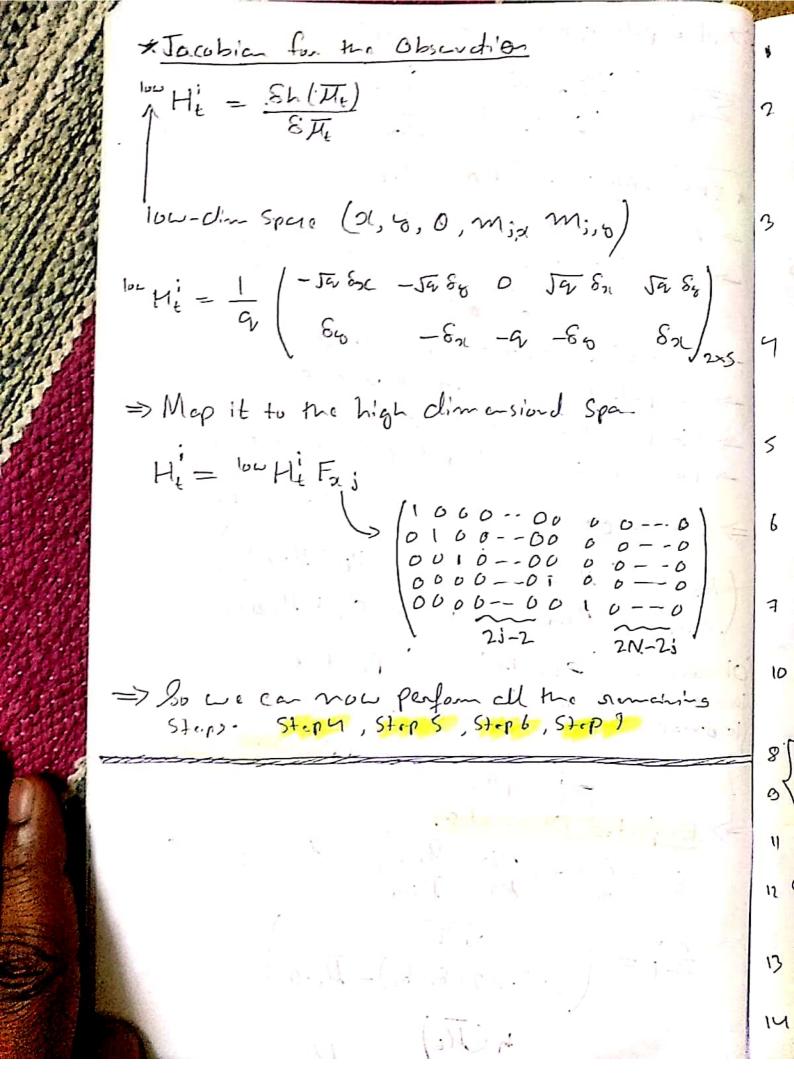
EKF SLAM * Defination of SLAM Broblem 61000 O The probot's Controls U1:7 = { U1, U2, U3. . . . UT} @ Observations ZI:T = { Z1, Z2 - . . ZT} Wanted O Map of the Environment @ Padh of the stobut $\chi_{0:\tau} = \{\alpha_0, \chi_1, \dots (\alpha_r)\}$ -> Only this fin Online SLAM * EKF Slam Assumption: Known cosnespondences => State space (for 20 plane) is α = (α, y, o, M, o, M, o, --- Mn, o, Mno) Positions of subut => map with on landmark: (3+2n)-dim ensiond. $\mathcal{U} = \begin{pmatrix} \chi \\ m \end{pmatrix} \quad \mathcal{Z} = \begin{pmatrix} \sum_{\chi \chi} \sum_{\chi m} \\ \sum_{m \chi} \sum_{m m} \end{pmatrix}$

observited V (slote)

* EKF SLAM : F 1. Ado prodic 2. Measurement 3. Machine cot 4. Data asso. s. Update * Assumption · O Robot ma 1 Velocity -3 Robot Ob Q Rage - b 3 Known @ Known' * Initializa => Robot Sto (all lond Mo= 10 ∑o = |



* Motion model (update stop) => Forom the motion in the place Ē, $\begin{pmatrix} \chi' \\ \vartheta' \\ \vartheta' \end{pmatrix} = \begin{pmatrix} \chi \\ \vartheta \\ \vartheta \end{pmatrix} + \begin{pmatrix} -\frac{V_t}{U_t} Si-0 + \frac{V_t}{U_t} Si-(0+U_t st) \\ \frac{V_t}{U_t} Cos & 1-\frac{V_t}{U_t} Cos & (0+U_t st) \end{pmatrix}$ * EKF => to the 2N+3 dimensional Space: $\begin{pmatrix}
\chi' \\
\psi' \\
\theta'
\end{pmatrix} = \begin{pmatrix}
\chi \\
\psi \\
0
\end{pmatrix} + \begin{pmatrix}
1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 1 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 1 & 0 & 0 & 0 & 0 & 0
\end{pmatrix}$ $\begin{pmatrix}
-\frac{V_t}{U_t}S_{1}\sim 0 + \frac{V_t}{U_t}S_{1}\sim (0 + U_t ot) \\
\frac{V_t}{U_t}C_{0}>0 - \frac{V_t}{U_t}C_{0}>(0 + U_t ot) \\
\frac{V_t}{U_t}C_{0}>0 - \frac{V_t}{U_t}C_{0}>(0 + U_t ot)
\end{pmatrix}$ $\frac{V_t}{U_t}C_{0}>0 - \frac{V_t}{U_t}C_{0}>(0 + U_t ot)$ -> In -> Co $g(u_t, x_t)$ => for Stop 3: \(\overline{\Sigma_t} = G_t \St-1 G_t + R_t. $G_t = \begin{pmatrix} G_t^{\chi} & O \\ O & I \end{pmatrix}$ > Jacobian of the motion (3x3) Obser Ideality (2NXIN) $G_{1}^{2} = \begin{pmatrix} 1 & 0 & -\frac{V_{t}}{V_{t}}\cos(0 + \frac{V_{t}}{V_{t}}\cos(0 + \frac{V_{t}}{V_{t}}\sin(0 + \frac{V_{$ Sfor Valucita motion) fonly chargo uncertaints) (Fx Ri Fx) (Incentainty of the)
motion model
assumed to be



$$F_{k} = \sum_{i=1}^{k} \sum_{i=1}^$$