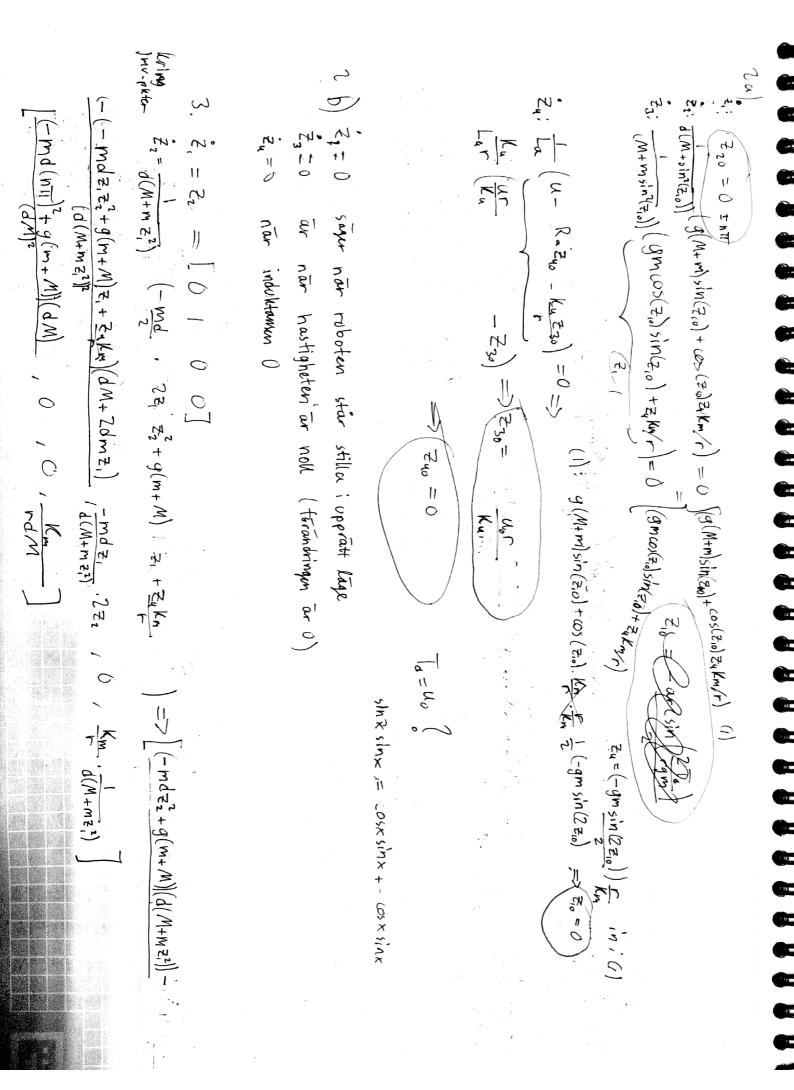
$(m+M)\dot{z}_3 - m\dot{d}_{2}(s)\dot{z}_1 + md\sin(z)\dot{z}_2 = T_a/C$ $(cos(z))\dot{z}_3 - dz_2 + g\sin(z_1) = 0$ = (m+M-mas(z)) + mosin(z) zi - mg co(z) sin(z) = To/mcos(E)== mdcos(=)=+ mgcox=)sin(=)=0 (M+((++)20)-1)m) (cos(z)(m+M)z, -d(m+M)z, +g(m+M)sin(z)=0 To = Knin (u- Rala J Ea: Kings -4 + Razy + Lazy + Kywa =0 $\overline{\zeta}_{3} = \frac{1}{(M+\sin^{2}(\overline{z}_{1})m)} \left(-md\sin(\overline{z}_{1})\overline{z}_{2}^{2} + mg\cos(\overline{z}_{1})\sin(\overline{z}_{1}) + T_{d}/r\right)$ $\frac{1}{(M+m\sin^2(z_1))} \left(-md\sin(z_1) z_1 + gm\cos(z_1)\sin(z_1) + I_a/r \right)$



$$A = \begin{bmatrix} 0 & 0 & 0 & 0 \\ \frac{-md(n\pi)^2 + g(M+m)}{dM} & 0 & 0 & \frac{K_m}{rdM} \\ \frac{(gm - mdn\pi)}{M} & 0 & 0 & \frac{K_m}{rM} \\ 0 & 0 & -\frac{Ru}{r+a} & -\frac{Ra}{La} \end{bmatrix} \quad B = \begin{bmatrix} 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \end{bmatrix} \begin{bmatrix} z_1 \\ z_2 \\ z_3 \\ z_4 \end{bmatrix}$$