$$th = \Theta$$

$$H_i = \begin{bmatrix} -\cos th & \sin th & (-x_f \sin th + x_r \sin th - y_f \cos th + y_r \cos th) & 0 & 0 \\ -\sin th & -\cos th & (x_f \cos th - x_r \cos th - y_f \sin th + y_r \sin th) & 0 & 0 \\ & \cos th & -\sin th \\ \cdots & \sin th & \cos th \end{bmatrix} \cdots$$