$$input = \begin{pmatrix} v_1 | q_1 & p_1 \\ v_2 | q_2 & p_2 \\ v_3 | q_3 & p_3 \end{pmatrix}$$

h_{i+1}

h_i

GRUcell

GHNN

H

$\nabla_{q,p} H$

$$A = \begin{pmatrix} 0 & 1 & 0 \\ 1 & 0 & 0 \\ 1 & 1 & 0 \end{pmatrix}$$