

$$\begin{pmatrix} 1-p & 0 & 0 & p \\ 0 & 1-p & p & 0 \\ 0 & p & 1-p & 0 \\ p & 0 & 0 & 1-p \end{pmatrix} \begin{pmatrix} P_{AA} \\ P_{AH} \\ P_{HA} \\ P_{HH} \end{pmatrix}$$