$$\mathbf{h}^{(3)} = \mathbf{h}^{(2)} \, \mathbf{M}^{(3)}$$

$$q(s_3 | s_1, s_2) \propto \mathbf{h}^{(3)\dagger} \, \boldsymbol{\gamma}^{(3)} \, \mathbf{h}^{(3)}$$