$$H_{29} = \begin{bmatrix} -2\,h - 6\,\mu + U & -\left(\sqrt{\frac{2}{3}}\,t\right) & -\left(\sqrt{3}\,t\right) & 0 \\ -\left(\sqrt{\frac{2}{3}}\,t\right) & -2\,h - 6\,\mu + U & 0 & \frac{-2\,t}{\sqrt{3}} \\ -\left(\sqrt{3}\,t\right) & 0 & -2\,h - 6\,\mu + 2\,U & 0 \\ 0 & \frac{-2\,t}{\sqrt{3}} & 0 & -2\,h - 6\,\mu + U \end{bmatrix}$$