$$
H_{63} = \begin{bmatrix}
-6\,\mu + 2\,U & \sqrt{3}\,t & 0 & 0 & 0 & 0 & 0 & 0 & \sqrt{3}\,t & 0 & 0 \\
\sqrt{3}\,t & -6\,\mu + 2\,U & -\left(\sqrt{6}\,t\right) & 0 & 0 & 0 & -t & \sqrt{2}\,t & 0 & t & -\left(\sqrt{2}\,t\right) \\
0 & -\left(\sqrt{6}\,t\right) & -6\,\mu + 2\,U & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & -6\,\mu & 0 & 3\sqrt{\frac{2}{6+\sqrt{6}}}\,t + \sqrt{\frac{3}{6+\sqrt{6}}}\,t & -\left(\sqrt{\frac{2}{6+\sqrt{6}}}\,t\right) + 3\sqrt{\frac{3}{6+\sqrt{6}}}\,t & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & -6\,\mu & 3\sqrt{\frac{6}{18-3\sqrt{6}}}\,t - \frac{3\,t}{\sqrt{18-3\sqrt{6}}} & -\left(\sqrt{\frac{2}{6-\sqrt{6}}}\,t\right) - 3\sqrt{\frac{3}{6-\sqrt{6}}}\,t & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 3\sqrt{\frac{2}{6+\sqrt{6}}}\,t + \sqrt{\frac{3}{6+\sqrt{6}}}\,t & 3\sqrt{\frac{6}{18-3\sqrt{6}}}\,t - \frac{3\,t}{\sqrt{18-3\sqrt{6}}} & -6\,\mu + U & 0 & -\left(\sqrt{2}\,t\right) & 0 & 0 & 0 & -2\,t \\
0 & 0 & 0 & -\left(\sqrt{\frac{2}{6+\sqrt{6}}}\,t\right) + 3\sqrt{\frac{3}{6+\sqrt{6}}}\,t & -\left(\sqrt{\frac{2}{6-\sqrt{6}}}\,t\right) - 3\sqrt{\frac{3}{6-\sqrt{6}}}\,t & 0 & -6\,\mu + U & 0 & -2\,t & 0 & -2\,\sqrt{2}\,t & 2\,t \\
0 & -t & 0 & 0 & 0 & -\left(\sqrt{2}\,t\right) & 0 & -6\,\mu + U & 0 & -2\,t & 0 & 0 \\
0 & \sqrt{2}\,t & 0 & 0 & 0 & 0 & -2\,t & 0 & -6\,\mu + U & 0 & 0 & 0 \\
\sqrt{3}\,t & 0 & 0 & 0 & 0 & 0 & 0 & -2\,t & 0 & -6\,\mu + U & -t & 0 \\
0 & t & 0 & 0 & 0 & 0 & -2\,\sqrt{2}\,t & 0 & 0 & -t & -6\,\mu + 2\,U & 0 \\
0 & -\left(\sqrt{2}\,t\right) & 0 & 0 & 0 & -2\,t & 2\,t & 0 & 0 & 0 & 0 & -6\,\mu + 2\,U
\end{bmatrix}
$$