$$
H_{47} = \begin{bmatrix}
-2\,h-6\,\mu+U & \frac{-11\,t}{12}-\frac{\frac{\mathbf{i}}{4}\,t}{\sqrt{3}} & 0 & \frac{\frac{\mathbf{i}}{2}\,t}{\sqrt{2}}+\frac{7\,t}{2\,\sqrt{6}} & 0 & \frac{\frac{\mathbf{i}}{2}\,t}{\sqrt{2}}-\frac{5\,t}{2\,\sqrt{6}} & 0 & 0 & 0 & 0 & 0 & \frac{t}{3\,\sqrt{2}}-\frac{\mathbf{i}\,t}{\sqrt{6}} & 0 & \frac{-3\,\mathbf{i}}{4}\,t+\frac{\sqrt{3}\,t}{4} \\
\frac{-11\,t}{12}+\frac{\frac{\mathbf{i}}{4}\,t}{\sqrt{3}} & -2\,h-6\,\mu+U & 0 & 0 & -\left(\frac{t}{\sqrt{6}}\right) & 0 & \frac{\frac{\mathbf{i}}{2}\,t}{\sqrt{2}}-\frac{t}{2\,\sqrt{6}} & 0 & 0 & \frac{\mathbf{i}}{2}\,t+\frac{t}{2\,\sqrt{3}} & -\mathbf{i}\,\sqrt{\frac{2}{3}}\,t-\frac{\sqrt{2}\,t}{3} & 0 & \frac{-\mathbf{i}}{4}\,t-\frac{t}{4\,\sqrt{3}} & 0 \\
0 & 0 & -2\,h-6\,\mu+2\,U & 0 & -\left(\sqrt{2}\,t\right) & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -2\,t & 0 \\
\frac{\frac{-\mathbf{i}}{2}\,t}{\sqrt{2}}+\frac{7\,t}{2\,\sqrt{6}} & 0 & 0 & -2\,h-6\,\mu+2\,U & \frac{-t}{2}-\frac{\mathbf{i}}{2}\,\sqrt{3}\,t & 0 & 0 & 0 & 0 & -\left(\sqrt{2}\,t\right) & -\mathbf{i}\,t+\frac{t}{\sqrt{3}} & 0 & \frac{\mathbf{i}}{2}\,\sqrt{\frac{3}{2}}\,t+\frac{t}{2\,\sqrt{2}} & 0 \\
0 & -\left(\frac{t}{\sqrt{6}}\right) & -\left(\sqrt{2}\,t\right) & \frac{-t}{2}+\frac{\mathbf{i}}{2}\,\sqrt{3}\,t & -2\,h-6\,\mu+2\,U & 0 & 0 & 0 & 0 & 0 & 0 & \frac{-2\,t}{\sqrt{3}} & 0 & \mathbf{i}\,\sqrt{\frac{3}{2}}\,t \\
\frac{\frac{-\mathbf{i}}{2}\,t}{\sqrt{2}}-\frac{5\,t}{2\,\sqrt{6}} & 0 & 0 & 0 & 0 & -2\,h-6\,\mu+2\,U & \frac{-t}{2}-\frac{\mathbf{i}}{2}\,\sqrt{3}\,t & t & 0 & 0 & -\mathbf{i}\,t+\frac{t}{\sqrt{3}} & 0 & \frac{\mathbf{i}}{2}\,\sqrt{\frac{3}{2}}\,t-\frac{3\,t}{2\,\sqrt{2}} & 0 \\
0 & \frac{\frac{-\mathbf{i}}{2}\,t}{\sqrt{2}}-\frac{t}{2\,\sqrt{6}} & 0 & 0 & 0 & \frac{-t}{2}+\frac{\mathbf{i}}{2}\,\sqrt{3}\,t & -2\,h-6\,\mu+2\,U & 0 & \frac{-t}{2}-\frac{\mathbf{i}}{2}\,\sqrt{3}\,t & 0 & 0 & -\mathbf{i}\,t-\frac{t}{\sqrt{3}} & 0 & \frac{\mathbf{i}}{2}\,\sqrt{\frac{3}{2}}\,t+\frac{t}{2\,\sqrt{2}} \\
0 & 0 & 0 & 0 & 0 & t & 0 & -2\,h-6\,\mu+2\,U & \frac{t}{2}+\frac{\mathbf{i}}{2}\,\sqrt{3}\,t & 0 & 0 & 0 & 0 & \mathbf{i}\,\sqrt{\frac{3}{2}}\,t-\frac{t}{\sqrt{2}} \\
0 & 0 & 0 & 0 & 0 & 0 & \frac{-t}{2}+\frac{\mathbf{i}}{2}\,\sqrt{3}\,t & \frac{t}{2}-\frac{\mathbf{i}}{2}\,\sqrt{3}\,t & -2\,h-6\,\mu+2\,U & -\left(\sqrt{2}\,t\right) & 0 & 0 & 0 & 0 \\
0 & \frac{-\mathbf{i}}{2}\,t+\frac{t}{2\,\sqrt{3}} & 0 & -\left(\sqrt{2}\,t\right) & 0 & 0 & 0 & 0 & -\left(\sqrt{2}\,t\right) & -2\,h-6\,\mu+U & 0 & \frac{\mathbf{i}\,t}{\sqrt{2}}-\frac{t}{\sqrt{6}} & 0 & \frac{t}{2}-\frac{\mathbf{i}}{2}\,\sqrt{3}\,t \\
0 & \mathbf{i}\,\sqrt{\frac{2}{3}}\,t-\frac{\sqrt{2}\,t}{3} & 0 & \mathbf{i}\,t+\frac{t}{\sqrt{3}} & 0 & \mathbf{i}\,t+\frac{t}{\sqrt{3}} & 0 & 0 & 0 & 0 & -2\,h-6\,\mu+U & \frac{-5\,t}{6}-\frac{\frac{\mathbf{i}}{2}\,t}{\sqrt{3}} & 0 & 0 \\
\frac{t}{3\,\sqrt{2}}+\frac{\mathbf{i}\,t}{\sqrt{6}} & 0 & 0 & 0 & \frac{-2\,t}{\sqrt{3}} & 0 & \mathbf{i}\,t-\frac{t}{\sqrt{3}} & 0 & 0 & \frac{-\mathbf{i}\,t}{\sqrt{2}}-\frac{t}{\sqrt{6}} & \frac{-5\,t}{6}+\frac{\frac{\mathbf{i}}{2}\,t}{\sqrt{3}} & -2\,h-6\,\mu+U & \frac{-\mathbf{i}\,t}{\sqrt{2}}-\frac{t}{\sqrt{6}} & 0 \\
0 & \frac{\mathbf{i}}{4}\,t-\frac{t}{4\,\sqrt{3}} & -2\,t & \frac{-\mathbf{i}}{2}\,\sqrt{\frac{3}{2}}\,t+\frac{t}{2\,\sqrt{2}} & 0 & \frac{-\mathbf{i}}{2}\,\sqrt{\frac{3}{2}}\,t-\frac{3\,t}{2\,\sqrt{2}} & 0 & 0 & 0 & 0 & 0 & \frac{\mathbf{i}\,t}{\sqrt{2}}-\frac{t}{\sqrt{6}} & -2\,h-6\,\mu+U & \frac{-3\,t}{4}-\frac{\mathbf{i}}{4}\,\sqrt{3}\,t \\
\frac{3\,\mathbf{i}}{4}\,t+\frac{\sqrt{3}\,t}{4} & 0 & 0 & 0 & -\mathbf{i}\,\sqrt{\frac{3}{2}}\,t & 0 & \frac{-\mathbf{i}}{2}\,\sqrt{\frac{3}{2}}\,t+\frac{t}{2\,\sqrt{2}} & -\mathbf{i}\,\sqrt{\frac{3}{2}}\,t-\frac{t}{\sqrt{2}} & 0 & \frac{t}{2}+\frac{\mathbf{i}}{2}\,\sqrt{3}\,t & 0 & 0 & \frac{-3\,t}{4}+\frac{\mathbf{i}}{4}\,\sqrt{3}\,t & -2\,h-6\,\mu+U
\end{bmatrix}
$$