$$
H_{135} = \begin{bmatrix}
2\,h-6\,\mu+U & \frac{5\,t}{12}-\frac{\frac{7\,\mathbf{i}}{4}\,t}{\sqrt{3}} & \frac{t}{\sqrt{3}} & 0 & 0 & \frac{\mathbf{i}}{2}\,t-\frac{\sqrt{3}\,t}{2} & 0 & 0 & 0 & \mathbf{i}\,\sqrt{\frac{2}{3}}\,t+\frac{\sqrt{2}\,t}{3} & 0 & \frac{\mathbf{i}}{4}\,t+\frac{t}{4\,\sqrt{3}} \\
\frac{5\,t}{12}+\frac{\frac{7\,\mathbf{i}}{4}\,t}{\sqrt{3}} & 2\,h-6\,\mu+U & 0 & \frac{\mathbf{i}}{2}\,t-\frac{7\,t}{2\,\sqrt{3}} & 2\,t-\frac{2\,\mathbf{i}\,t}{\sqrt{3}} & 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} & 0 \\
\frac{t}{\sqrt{3}} & 0 & 2\,h-6\,\mu+2\,U & \frac{3\,t}{4}+\frac{\mathbf{i}}{4}\,\sqrt{3}\,t & 0 & 0 & 0 & \frac{3\,\mathbf{i}}{4}\,t-\frac{\sqrt{3}\,t}{4} & -\left(\sqrt{\frac{2}{3}}\,t\right)+\mathbf{i}\,\sqrt{2}\,t & 0 & \frac{-3\,t}{2}-\frac{\mathbf{i}}{2}\,\sqrt{3}\,t & 0 \\
0 & \frac{-\mathbf{i}}{2}\,t-\frac{7\,t}{2\,\sqrt{3}} & \frac{3\,t}{4}-\frac{\mathbf{i}}{4}\,\sqrt{3}\,t & 2\,h-6\,\mu+2\,U & 0 & t & \frac{-3\,\mathbf{i}}{4}\,t-\frac{\sqrt{3}\,t}{4} & 0 & 0 & -\left(\sqrt{\frac{2}{3}}\,t\right)-\mathbf{i}\,\sqrt{2}\,t & 0 & \frac{-t}{2}+\frac{\mathbf{i}}{2}\,\sqrt{3}\,t \\
0 & 2\,t+\frac{2\,\mathbf{i}\,t}{\sqrt{3}} & 0 & 0 & 2\,h-6\,\mu & 0 & 0 & 0 & 0 & -\left(\frac{t}{\sqrt{2}}\right)+\frac{5\,\mathbf{i}\,t}{\sqrt{6}} & 0 & 0 \\
\frac{-\mathbf{i}}{2}\,t-\frac{\sqrt{3}\,t}{2} & 0 & 0 & t & 0 & 2\,h-6\,\mu+U & 0 & -\left(\sqrt{3}\,t\right) & -\left(\sqrt{\frac{3}{2}}\,t\right)+\frac{\mathbf{i}\,t}{\sqrt{2}} & 0 & \frac{-3\,t}{2}-\frac{\mathbf{i}}{2}\,\sqrt{3}\,t & 0 \\
0 & 0 & 0 & \frac{3\,\mathbf{i}}{4}\,t-\frac{\sqrt{3}\,t}{4} & 0 & 0 & 2\,h-6\,\mu+2\,U & \frac{t}{4}+\frac{3\,\mathbf{i}}{4}\,\sqrt{3}\,t & 0 & 0 & \frac{3\,\mathbf{i}}{2}\,t+\frac{\sqrt{3}\,t}{2} & 0 \\
0 & 0 & \frac{-3\,\mathbf{i}}{4}\,t-\frac{\sqrt{3}\,t}{4} & 0 & 0 & -\left(\sqrt{3}\,t\right) & \frac{t}{4}-\frac{3\,\mathbf{i}}{4}\,\sqrt{3}\,t & 2\,h-6\,\mu+2\,U & 0 & 0 & 0 & 0 \\
0 & \frac{-t}{3\,\sqrt{2}}+\frac{\mathbf{i}\,t}{\sqrt{6}} & -\left(\sqrt{\frac{2}{3}}\,t\right)-\mathbf{i}\,\sqrt{2}\,t & 0 & 0 & -\left(\sqrt{\frac{3}{2}}\,t\right)-\frac{\mathbf{i}\,t}{\sqrt{2}} & 0 & 0 & 2\,h-6\,\mu+U & \frac{-7\,t}{6}+\frac{\frac{\mathbf{i}}{2}\,t}{\sqrt{3}} & 0 & \frac{-\mathbf{i}\,t}{\sqrt{2}}+\frac{t}{\sqrt{6}} \\
-\mathbf{i}\,\sqrt{\frac{2}{3}}\,t+\frac{\sqrt{2}\,t}{3} & 0 & 0 & -\left(\sqrt{\frac{2}{3}}\,t\right)+\mathbf{i}\,\sqrt{2}\,t & -\left(\frac{t}{\sqrt{2}}\right)-\frac{5\,\mathbf{i}\,t}{\sqrt{6}} & 0 & 0 & 0 & \frac{-7\,t}{6}-\frac{\frac{\mathbf{i}}{2}\,t}{\sqrt{3}} & 2\,h-6\,\mu+U & 0 & 0 \\
0 & \frac{-3\,\mathbf{i}}{4}\,t-\frac{\sqrt{3}\,t}{4} & \frac{-3\,t}{2}+\frac{\mathbf{i}}{2}\,\sqrt{3}\,t & 0 & 0 & \frac{-3\,t}{2}+\frac{\mathbf{i}}{2}\,\sqrt{3}\,t & \frac{-3\,\mathbf{i}}{2}\,t+\frac{\sqrt{3}\,t}{2} & 0 & 0 & 0 & 2\,h-6\,\mu+U & \frac{t}{4}-\frac{3\,\mathbf{i}}{4}\,\sqrt{3}\,t \\
\frac{-\mathbf{i}}{4}\,t+\frac{t}{4\,\sqrt{3}} & 0 & 0 & \frac{-t}{2}-\frac{\mathbf{i}}{2}\,\sqrt{3}\,t & 0 & 0 & 0 & 0 & \frac{\mathbf{i}\,t}{\sqrt{2}}+\frac{t}{\sqrt{6}} & 0 & \frac{t}{4}+\frac{3\,\mathbf{i}}{4}\,\sqrt{3}\,t & 2\,h-6\,\mu+U
\end{bmatrix}
$$