$$
H_{109} = \left[\begin{array}{cccccccccccccc}
-6\,\mu + U & 0 & \frac{-3\,t}{4} - \frac{3\,\mathbf{i}}{4}\,\sqrt{3}\,t & 0 & \frac{t}{2} & \frac{\mathbf{i}}{2}\,\sqrt{\frac{3}{2}}\,t - \frac{t}{2\,\sqrt{2}} & 0 & 0 & \frac{\sqrt{3}\,t}{2} & \frac{-\left(\sqrt{\frac{3}{2}}\,t\right)}{2} + \frac{\frac{3\,\mathbf{i}}{2}\,t}{\sqrt{2}} & 0 & 0 & \frac{3\,\mathbf{i}}{4}\,t - \frac{3\,\sqrt{3}\,t}{4} & 0 \\
0 & -6\,\mu + 2\,U & \frac{-t}{4} - \frac{3\,\mathbf{i}}{4}\,\sqrt{3}\,t & 0 & 0 & \frac{-3\,t}{\sqrt{2}} & -2\,\sqrt{2}\,t & 0 & 0 & -\left(\sqrt{\frac{3}{2}}\,t\right) & 0 & 0 & \frac{-3\,\mathbf{i}}{4}\,t + \frac{\sqrt{3}\,t}{4} & 0 \\
\frac{-3\,t}{4} + \frac{3\,\mathbf{i}}{4}\,\sqrt{3}\,t & \frac{-t}{4} + \frac{3\,\mathbf{i}}{4}\,\sqrt{3}\,t & -6\,\mu + 2\,U & \frac{-\mathbf{i}}{2}\,\sqrt{\frac{3}{2}}\,t - \frac{5\,t}{2\,\sqrt{2}} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\,\mathbf{i}}{4}\,t - \frac{\sqrt{3}\,t}{4} & \frac{3\,\mathbf{i}}{4}\,t + \frac{\sqrt{3}\,t}{4} & 0 & \frac{-\left(\sqrt{\frac{3}{2}}\,t\right)}{2} - \frac{\frac{3\,\mathbf{i}}{2}\,t}{\sqrt{2}} \\
0 & 0 & \frac{\mathbf{i}}{2}\,\sqrt{\frac{3}{2}}\,t - \frac{5\,t}{2\,\sqrt{2}} & -6\,\mu + 2\,U & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{-\left(\sqrt{\frac{3}{2}}\,t\right)}{2} + \frac{\frac{3\,\mathbf{i}}{2}\,t}{\sqrt{2}} & 0 \\
\frac{t}{2} & 0 & 0 & 0 & -6\,\mu + U & 0 & 0 & -\mathbf{i}\,\sqrt{\frac{3}{2}}\,t + \frac{t}{\sqrt{2}} & 0 & 0 & \frac{3\,\mathbf{i}}{2}\,t & \frac{-3\,\mathbf{i}}{2}\,t + \frac{\sqrt{3}\,t}{2} & 0 & 0 \\
\frac{-\mathbf{i}}{2}\,\sqrt{\frac{3}{2}}\,t - \frac{t}{2\,\sqrt{2}} & \frac{-3\,t}{\sqrt{2}} & 0 & 0 & 0 & -6\,\mu + U & 0 & 0 & 0 & 0 & \frac{-3\,\sqrt{\frac{3}{2}}\,t}{2} + \frac{\frac{3\,\mathbf{i}}{2}\,t}{\sqrt{2}} & \sqrt{\frac{3}{2}}\,t & 0 & 0 \\
0 & -2\,\sqrt{2}\,t & 0 & 0 & 0 & 0 & -6\,\mu + 3\,U & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & \mathbf{i}\,\sqrt{\frac{3}{2}}\,t + \frac{t}{\sqrt{2}} & 0 & 0 & -6\,\mu & -\left(\sqrt{\frac{3}{2}}\,t\right) - \frac{3\,\mathbf{i}\,t}{\sqrt{2}} & 0 & 0 & 0 & 0 & 0 \\
\frac{\sqrt{3}\,t}{2} & 0 & 0 & 0 & 0 & 0 & 0 & -\left(\sqrt{\frac{3}{2}}\,t\right) + \frac{3\,\mathbf{i}\,t}{\sqrt{2}} & -6\,\mu + U & 0 & \frac{-\mathbf{i}}{2}\,\sqrt{3}\,t & \frac{t}{2} - \frac{\mathbf{i}}{2}\,\sqrt{3}\,t & 0 & \sqrt{2}\,t + \mathbf{i}\,\sqrt{6}\,t \\
\frac{-\left(\sqrt{\frac{3}{2}}\,t\right)}{2} - \frac{\frac{3\,\mathbf{i}}{2}\,t}{\sqrt{2}} & -\left(\sqrt{\frac{3}{2}}\,t\right) & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -6\,\mu + U & \frac{-\mathbf{i}}{2}\,\sqrt{\frac{3}{2}}\,t + \frac{3\,t}{2\,\sqrt{2}} & \frac{t}{\sqrt{2}} & 0 & 0 \\
0 & 0 & \frac{-3\,\mathbf{i}}{4}\,t - \frac{\sqrt{3}\,t}{4} & 0 & \frac{-3\,\mathbf{i}}{2}\,t & \frac{-3\,\sqrt{\frac{3}{2}}\,t}{2} - \frac{\frac{3\,\mathbf{i}}{2}\,t}{\sqrt{2}} & 0 & 0 & \frac{\mathbf{i}}{2}\,\sqrt{3}\,t & \frac{\mathbf{i}}{2}\,\sqrt{\frac{3}{2}}\,t + \frac{3\,t}{2\,\sqrt{2}} & -6\,\mu + U & 0 & \frac{5\,t}{4} + \frac{\mathbf{i}}{4}\,\sqrt{3}\,t & 0 \\
0 & 0 & \frac{-3\,\mathbf{i}}{4}\,t + \frac{\sqrt{3}\,t}{4} & 0 & \frac{3\,\mathbf{i}}{2}\,t + \frac{\sqrt{3}\,t}{2} & \sqrt{\frac{3}{2}}\,t & 0 & 0 & \frac{t}{2} + \frac{\mathbf{i}}{2}\,\sqrt{3}\,t & \frac{t}{\sqrt{2}} & 0 & -6\,\mu + 2\,U & \frac{-3\,t}{4} - \frac{\mathbf{i}}{4}\,\sqrt{3}\,t & 0 \\
\frac{-3\,\mathbf{i}}{4}\,t - \frac{3\,\sqrt{3}\,t}{4} & \frac{3\,\mathbf{i}}{4}\,t + \frac{\sqrt{3}\,t}{4} & 0 & \frac{-\left(\sqrt{\frac{3}{2}}\,t\right)}{2} - \frac{\frac{3\,\mathbf{i}}{2}\,t}{\sqrt{2}} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\,t}{4} - \frac{\mathbf{i}}{4}\,\sqrt{3}\,t & \frac{-3\,t}{4} + \frac{\mathbf{i}}{4}\,\sqrt{3}\,t & -6\,\mu + 2\,U & \frac{\mathbf{i}}{2}\,\sqrt{\frac{3}{2}}\,t - \frac{3\,t}{2\,\sqrt{2}} \\
0 & 0 & \frac{-\left(\sqrt{\frac{3}{2}}\,t\right)}{2} + \frac{\frac{3\,\mathbf{i}}{2}\,t}{\sqrt{2}} & 0 & 0 & 0 & 0 & 0 & \sqrt{2}\,t - \mathbf{i}\,\sqrt{6}\,t & 0 & 0 & 0 & \frac{-\mathbf{i}}{2}\,\sqrt{\frac{3}{2}}\,t - \frac{3\,t}{2\,\sqrt{2}} & -6\,\mu + 2\,U
\end{array}\right]
$$