Homework
Due date: April 26, 2022

TECHNISCHE UNIVERSITÄT DARMSTADT

ML4MS

Defining a matrix $M = \begin{pmatrix} 0 & F(x,y) \\ F^*(x,y) & 0 \end{pmatrix}$, where i is the unit complex number, $F(x,y) = e^{iy} + 2e^{-iy/2}cos(\frac{\sqrt{3}}{2}x)$, and $F^*(x,y)$ is the complex conjugate of $F(x,y)$.

1. (20 points) digonalize M for $x \in [-\pi, \pi]$ and $y \in [-\pi, \pi]$.
   Hint: Generate a grid (x, y), evaluate M for each (x, y), and use the numpy function numpy.linalg.eig (or similar functions) to diagonalize M.
2. (10 points) plot the eigenvalues (two of them) as surface plots on the (x,y)-plane
3. (10 points) get your code and results saved as a repository on Github