Problem 1, hw 08. Math 462/512.

The ODE system
$$\begin{cases} x_1' &= (-\sin 2t)x_1 + (\cos 2t - 1)x_2 \\ x_2' &= (\cos 2t + 1)x_1 + (\sin 2t)x_2 \end{cases}$$
has a fundamental matrix solution

$$\Phi(t) = \begin{pmatrix} e^t(\cos t - \sin t) & e^{-t}(\cos t + \sin t) \\ e^t(\cos t + \sin t) & e^{-t}(-\cos t + \sin t) \end{pmatrix}.$$

Obtain a matrix C such that $\Phi(t + \pi) = \Phi(t)C$ and find the Floquet (characteristic) exponents.