

Math 330 HW

Consider Mathieu's equation

$$u'' + (\delta + \gamma \cos 2t)u = 0.$$

For some values of (δ, γ) , the general solution is unstable (i.e. it exponentially grows), while for other values of (δ, γ) , the solution is stable (i.e., it remains bounded for all time). In the rectangle $-10 < \delta < 40$, $0 < \gamma < 40$, numerically determine in which region the solution is unstable, and in which region it is stable.

Remark: when γ is small, the stable and unstable regions can be determined analytically.