Computational Neuroscience
Project-1

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1. Let $\mu^{-1}\dot{y}$ = v, system of differential equations obtained:

   v' = (1-y*y)*mu*v - y/mu

   y' = mu*v

2. When the differential equation was solved using ODE45 and the results were plotted, the following oscillatory motion and phase plane plots were observed as shown in fig. 1.
3. For mu =100, when 600 samples were obtained using ODE15s the time consumed for solving the ODE was 1.498 seconds whereas while using ODE45 the time consumed was 19.381 seconds. Thus, the ODE15s outperformed ODE45 by a factor of 13.
4. The steady state was instantaneously obtained for mu = 100 whereas for mu=1 steady state was obtained after half a cycle. For mu=0.1 multiple cycles were required to reach the steady state.

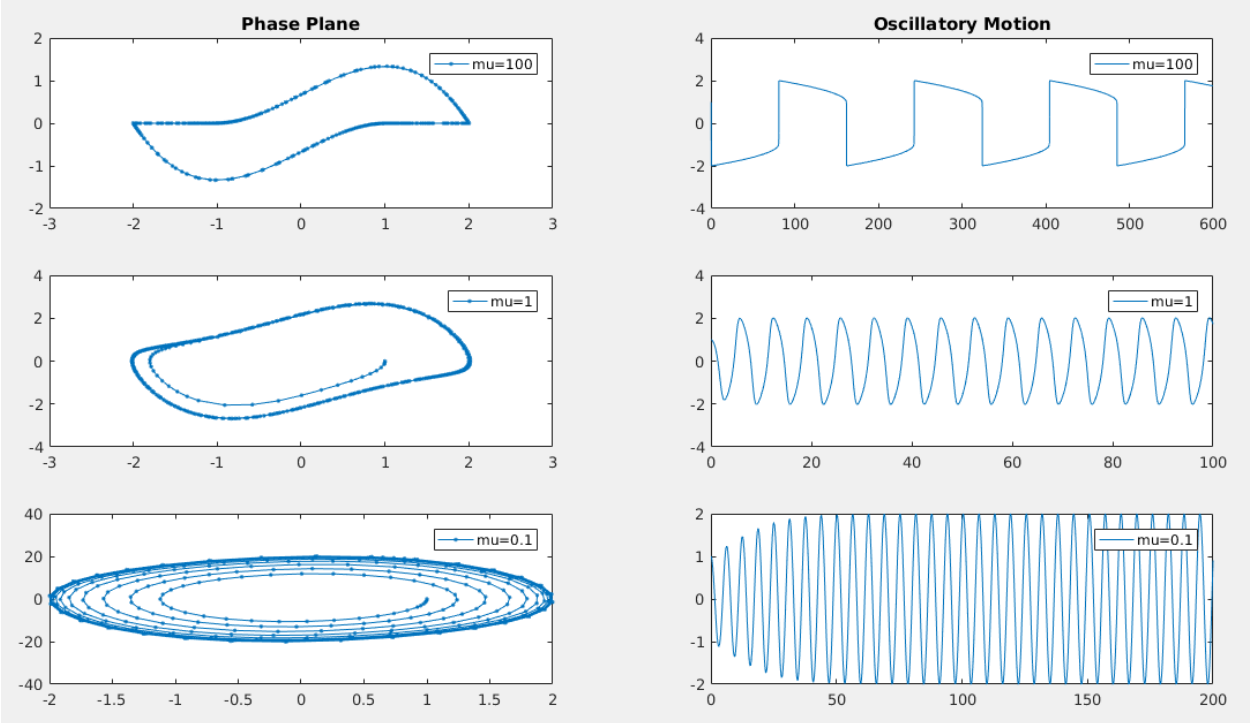

Fig.1