

EXTRA CREDIT 3

Due date: April 23, 2020, 11:55PM.

Bibliography: Trench, Chap 10, DYN lessons

1. Choose parameters $(\delta, \alpha, \beta, \gamma, \omega)$ of the forced Duffing equation

$$\ddot{x} + \delta \dot{x} + \alpha x + \beta x^3 = \gamma \cos(\omega t),$$

such that the shows chaotic, period-1, period-2, period-4 behavior. For each case, display the:

- a) Time trajectory $x(t)$, and velocity function $\dot{x}(t)$;
- b) Phase portrait of the system;
- c) Poincaré section.