ENME665: Nonlinear Oscillations

- Material covered in previous week and this week
  - ❖ Chapter 1, Nayfeh and Balachandran (1995, 2006)
    - ➤ Dissipation, Attraction, Attracting Sets
    - ➤ Lyapunov function based stability analyses

  - ❖ Chapter 2, Nayfeh and Balachandran (1995, 2006)
    - ➤ Local stability analyses- Linearization
    - ➤ Fixed points of maps and differential equation systems

- Material to be covered today and next week
  - ❖ Chapter 2, Nayfeh and Balachandran (1995, 2006)
    - ❖ Local stability analyses

❖ Example (Chapter 2, N&B)

$$\dot{x} = -x + x^3$$
$$\dot{y} = -2y$$

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❖ Why nonlinear analysis is necessary? (Chapter 2, N&B)

$$i) \; \ddot{x} + \varepsilon x^2 \dot{x} + x = 0$$

$$ii) \; \dot{x} = ax - x^3$$

$$iii) \; \dot{x} = -y + ax(x^2 + y^2)$$
$$\dot{y} = \;\; x + ay(x^2 + y^2)$$

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- Material to be covered next week
  - ❖ Chapter 2, Nayfeh and Balachandran (1995, 2006)