

**Perturbation Theory**  
**Homework # 2, due April 14**

Find first three terms in the asymptotic series solution of each of the following problems containing a small parameter  $\varepsilon \ll 1$ .

1. [From Bush]  $x^3 + x^2 - \varepsilon = 0$ .
2. [From Logan]  $\varepsilon x^2 + 2x + 1 = 0$ .
3. [From Bush, Page-13]  $\varepsilon x^3 - x + 1 = 0$ .
4. [From Logan]  $\varepsilon x^4 + \varepsilon x^3 - x^2 + 2x - 1 = 0$ .
5. [From Bush]  $\varepsilon x^4 - x^2 + 3x - 2 + \varepsilon = 0$