

Numerical Analysis HW8  
Ch12 - 3,9 (pg300)  
Ch13 - 1,3 (pg317)

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**Problem 3.** Use the Gauss-Seidel method to solve the following system until the percent relative error falls below  $\epsilon_r = \%$

$$\begin{array}{rrrr} 10x_1 & +2x_2 & -x_3 & = 27 \\ -3x_1 & -6x_2 & +2x_3 & = -61.5 \\ x_1 & +x_2 & +5x_3 & = -21.5 \end{array}$$

**Problem 9.** Determine the solutions of the simultaneous nonlinear equations:

$$\begin{array}{l} x^2 = 5 - y^2 \\ x^2 = y + 1 \end{array}$$

- (a) Graphically.
- (b) Successive substitution using initial guesses of  $x = y = 1.5$
- (c) Newton-Raphson using initial guesses of  $x = y = 1.5$

**Problem 1.** Repeat example 13.1, but for three masses with the  $m$ 's = 40 kg and the  $k$ 's = 240 N/m. Produce a plot like Fig. 13.4 to identify the principle modes of vibration.

**Problem 3.** Use the power method to determine the lowest eigenvalue and corresponding eigenvector for the system

$$\begin{bmatrix} 2 - \lambda & 8 & 10 \\ 8 & 4 - \lambda & 5 \\ 10 & 5 & 7 - \lambda \end{bmatrix}$$