# CHEN3600 – Computer-Aided Chemical Engineering Spring 2012

# Chemical Engineering Department HW 5

**T.D. Placek Auburn University**

 **HW 5 – Finding Roots Using fsolve**

1. (291) Solve the following set of equations:

$$x\_{1}^{2}+x\_{1}x\_{2}=10$$

$$x\_{2}+3x\_{1}x\_{2}^{2}=57$$

Also, prepare a plot of x1 versus x2.

1. (298) Consider the following set of chemical reactions:

$$2A+B=C$$

$$A+D=C$$

With the following equilibrium constants

$$K\_{1}=\frac{c\_{C}}{c\_{A}^{2}c\_{B}}$$

$$K\_{2}=\frac{c\_{C}}{c\_{A}c\_{D}}$$

Determine the steady state concentrations of all components for the following situation:

K1 = 4x10-4, K2 = 3.7x10-2, cA0 = 50, CB0 = 20, cC0 = 5, cD0 = 10

1. (126) A bungee jumpers velocity as a function of time can be represented by:

$$v(t)=\sqrt{\frac{gm}{C\_{D}}}tanh⁡\left(t\sqrt{\frac{gC\_{D}}{m}}\right)$$

 Answer the following question using SI units: Given a value of CD = 0.25 kg/m, what jumper mass would be associated with a velocity of 36 m/s at 4 s of time?