**ENG 60104 Computing Applications for Engineers**

**PALS 1**

**Answer using hand calculation**

[**Calculation**](https://github.com/superoo7/PALS/blob/master/PALS1/PALS1_Solution.pdf)

**Question 1**

Water is flowing in a trapezoidal channel at a rate of Q=20m3/s. The critical depth y for such a channel must satisfy the equation

where g=9.81m/s2, Ac=the cross sectional area (m2) and B=width of the channel at the surface (m). For this case, the width and the cross-sectional area can be related to depth y by

and

Solve for the criterion depth using the bisection and false position method. The initial guesses for both methods are xl=0.5 and xu=2.5. Iterate until the relative error falls below 5%. Then, write the Matlab script for both methods.

Answer: [q1.m](https://github.com/superoo7/PALS/blob/master/PALS2/q1.m)

**Question 2**

Determine the root of f(x) = 0.95x3 – 5.9x2 + 10.9x – 6 using the Newton Raphson method (three iterations, xi = 3.5) and the Secant method (three iterations, xi-1 = 2.5 and xi = 3.5)

**Question 3**

Determine the value of x1, x2 and x3 for the following equations using Cramer’s rule and Gauss Elimination method.

50 = 5x3 – 7x2

4x2 + 7x3 + 30 = 0

x1 – 7x3 = 40 – 3x2 + 5x1