

## COMPUTATIONAL METHODS MEEN3332

### Project Part 3

#### Project rules

The course projects offer you the chance to earn a total of up to 5% of your grade. They designed to accompany the course material and develop your programming skills. The project needs to be solved in MATLAB or Octave. We will simulate some real applications and you will have to submit individually. To respect your workload from other courses, the deadlines are generous, but be respectful of them. Late submission will not be accepted. The project will be submitted on Blackboard in the form of a Word document. Any handwritten parts need to be scanned/photographed and inserted to your word document.

The last three digits of your student ID are XYZ. This parameter will be used in our problems.

#### Problem 3

You are working as engineers in an oil drill. The table below, shows the drill tip distance as a function of time. Write MATLAB codes to calculate the velocity and acceleration of the drill tip using the forward, backward and centered differences with low and high accuracy.

Time (sec)	0	1	2	3	4	5	6	7	8	9	10	11	12
Depth (meters)	0	2	5	8	15	28	32	49	57	68	110	109	130

#### Extra Problem 4

You are working as engineers in an oil field. You know from the seismic measurements that the top of your oil reservoir follows the function  $f(x) = -3.8(x - XYZ)^2 - 8.6(x - XYZ) - 500 - XYZ$ , where  $x$  is the distance from your current location and  $y$  the depth in the ground. You also know that the bottom of your oil reservoir is  $f(x) = 3.8(x - XYZ)^2 + 8.6(x - XYZ) - 800 - XYZ$ . Plot in MATLAB the cross section of your reservoir. Write in MATLAB, codes to calculate the cross sectional area of your reservoir using the composite trapezoid and rectangle methods and the Simpson's 1/3 rule.