

# [MATH2605] Homework 5

Due: Feb. 16

## Problem 1: Matlab Practice #3

In the last homework, some people said that the matlab script is *interpreted* and some other said that it is *compiled*. Answer or do questions with \*.

1. Try `help for` and learn about `for` loops.
2. Make an array **A** of  $10^7$  random numbers. Make an array **B** of  $10^7$  zeros. \*What is the `for`-loop command that loops over all elements of **A** to perform  $\mathbf{B}_i = \mathbf{A}_i^2, i = 1, 2, 3, \dots, 10^7$ ?
3. \*What is the command that does the same operation without using the `for` loop? \*Which one is faster? \* Do you think that the script is compiled?

## Problem 2

Compute a quadratic function  $f(x,y)$  that passes the point  $(2,3)$  and has the gradient  $(1, 1)$ , the maximum curvature 3 along the direction  $(2, 1)$ , and the minimum curvature 2 along the direction  $(1, 1)$ .

Compute the function  $g(x,y)$  that is a plane tangent to  $f(x,y)$  at  $(2,3)$ .

Using Matlab, plot the graphs of  $f(x,y)$  and  $g(x,y)$ . Try to adjust the axis and the view angle so that we can see the point.

Submit  $f(x,y)$ , the matlab commands, and hand drawn sketches or printed copies of the graphs. Mark the point  $(2,3)$  on the graph.