MATH 353: Engineering Mathematics III – Section 012

Open Matlab and *move to the Desktop or to a folder where you can find your work* at the end of the session. Type these lines

```
>> diary myworkMarch14
>> format long
>> format compact
```

Download the functions `divideddiff.m` and `nested.m` from my website.

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1. What do the following lines do?

   ```
   >> linspace(1,3,7)
   >> linspace(0,4,10);
   ```

2. Type up the matrix

$$A = \begin{bmatrix} 1 & 2 & 3 \\ -1 & -4 & 0 \\ 2 & 3 & 1 \\ 2 & 1 & 1 \end{bmatrix}.$$

   (Remember: we write by rows, with blanks between elements and using semicolons to change rows.) How would you select the complete 3rd row? And the complete 3rd column?

3. If we define the following functions

   ```
   >> f = @(x) x.^2-2*x;
   >> g = @(x) f(x.^2);
   ```

   What function is g exactly? (Write down the mathematical expression.)

Interpolation using Newton's formula

4. Consider the points

$$(0,1), \quad (1,3), \quad (2,4), \quad (3,6), \quad (4,-2), \quad (5,0).$$

   Write a script that does all of the following steps:

   - Compute the divided differences with `divideddiff`.
   - Create a large list of points `xx` in the interval $[0,5]$ and evaluate the interpolation polynomial at `xx` using `nested`.
   - Plot the points where we interpolate with circular markers. Plot the interpolation polynomial on top of the points.
   - Adds label tags to the axes: x and y. (The commands are `xlabel` and `ylabel`)
   - Adds a legend explaining the graph. (The command is `legend`.)