

Maths and programming self-test

Here are some exercises you can try when applying to the MSc. It would be expected that none of these would be difficult to you and if you don't know the answer, you can solve it after a quick reminder with a web search.

Maths

1. Differentiate $\exp(\cos(x) + \sin(y))$ w.r.t. x .
2. Perform the integral $\int_z^1 \frac{1}{x} dx$.
3. Calculate the mean and variance of the outcome of a six-sided dice.
4. Calculate the determinant of this matrix $A = \begin{pmatrix} \cos(a) & -\sin(a) \\ \sin(a) & \cos(a) \end{pmatrix}$. What kind of matrix is this? What is the inverse?

Programming

We mainly use Python and Matlab (or its free variant Octave), but if you know any other language, that will be fine as well.

1. Simulate rolling a six-sided dice 100 times,
 - (a) Write the table with results to a text file
 - (b) Calculate mean and variance. (In Python and Matlab these operations can be done very compactly and efficiently)