

# Homework 1

## MA5755

### Due Feb 2

#### Written Part

Solve exercises 2.1, 2.3, 2.5 and 2.11 from Murphy's book.

#### Programming Part

Write a python function that determines the probability of being positive or negative after taking a medical test for a disease, using the method described in section 2.3.1. Your function should have an interface of the form

```
def medicalTest(h, YH):
```

where  $\mathbf{h}$  is a 2-vector with the prior distribution of the general population and  $\mathbf{YH}$  is a 2-by-2 matrix with the likelihoods of the medical test. Use the numpy package to define vectors and matrices. The function must return a vector  $\mathbf{p}$  that contains in  $\mathbf{p}[0]$  the probability of negative after testing negative and in  $\mathbf{p}[1]$  the probability of positive after testing positive.

First call this routine with the data in section 2.3.1 to ensure that your routine computes the right answers, then use this routine to solve problem 2.9.