02424 Week 6

Today you should be working on two exercises, the first is a theoretical exercise related to today's lecture, and the second is practical exercise. Both will prepare you well for the next assignment.

Exercise 1

As mentioned during the lecture, Eqs. (4.6) - (4.8) are fundamental results in Chapter 4. Now it's your job to prove these results.

First prove that in an exponential dispersion family the mean value is given by:
$$E[Y] = \kappa'(\theta)$$

Hint: Start with the result from theorem 2.2.

Then you should similarly prove Eq. (4.7), i.e. that

$$Var[Y] = \frac{\kappa''(\theta)}{\lambda}$$

Finally you should prove the function $\tau(\theta)$ is monotone.

The fact that this function is monotone provides background for the important one to one mapping of the *parameter space* on to the *mean value space*, ie. for

$$\mu = \tau(\theta)$$

of the *parameter space* on to the *mean value space*.

Exercise 2

Exercise 4.3 from the textbook.