

Exercises for seminar week 42

Rice, chapter 4: No. **75, 83** (use the mgf), **85** (see hint), **100** (read section 4.6 in Rice and (A4-5) in appendix 1 in Lecture notes to Rice chapter 5".)

Rice, chapter 5: No. **4, 5, 12**

Hint for ex 4:85: Remember the sum of a geometric series:

$$1 + a + a^2 + a^3 + \dots = \sum_{i=0}^{\infty} a^i = \frac{1}{1-a} \quad \text{for all numbers, } a, \text{ such that } |a| < 1.$$

A common factor in such a series can be taken outside the sum as for finite sums:

$$\sum_{i=0}^{\infty} ca^i = c \sum_{i=0}^{\infty} a^i$$

Hint for ex 5:5: Use Rice Exercise 4:82 and write λ_n for np so that $\lambda_n \rightarrow \lambda$. Then use (A6) from appendix 1 in the lecture notes to chapter 5, which says:

If $a_n, n = 1, 2, \dots$ is a sequence of numbers (see Sydsæter I, section 6.4) converging to a number, a (i.e. $a_n \xrightarrow{n \rightarrow \infty} a$), then

$$\left(1 + \frac{a_n}{n}\right)^n \xrightarrow{n \rightarrow \infty} e^a$$

(You can find a simple proof of this useful result in the lecture notes after (A6) if you are interested.)