

## Brief solutions to selected problems in homework 04

### 1. Section 10.7: Solutions, common mistakes and corrections:

Section 10.7, problem 60: See Lecture 07, Eg 3.

Homework 4, problem 3:

$$\text{Set } A(x) = \sum_{n=0}^{\infty} (-1)^n x^{2n} = a_0 x^0 + a_1 x^2 + \dots$$

$$B(x) = \sum_{n=0}^{\infty} \frac{(-1)^n x^{2n}}{2n!} = b_0 x^0 + b_1 x^2 + \dots$$

$$C(x) = \frac{1-x^2+\dots}{1-\frac{x^2}{2}+\dots} = \frac{A(x)}{B(x)} = c_0 x^0 + c_1 x^2 + \dots$$

$$c_0 = \frac{a_0}{b_0} = 1 \checkmark$$

$$c_1 = 0$$

$$a_1 = c_0 b_1 + c_2 b_0 \Rightarrow c_2 = \frac{1 \cdot 1 \cdot (-\frac{1}{2})}{1} = -\frac{1}{2}$$

$$c_3 = 0$$

$$a_2 = b_0 c_4 + b_1 c_2 + b_2 c_0$$

$$\Rightarrow 1 = c_4 + (-\frac{1}{2}) \cdot \frac{1}{2} + \frac{1}{24} \cdot 1$$

$$\Rightarrow c_4 = 1$$

$$1 = 1 \cdot c_4 + \frac{1}{2} \cdot (-\frac{1}{2}) + \frac{1}{24} \cdot 1$$

$$c_4 = 1 - \frac{1}{4} - \frac{1}{24}$$

$$= \frac{17}{24}$$

Figure 1: Homework 4, problem 3