

## Math 121, Winter 2023, Homework 6 Other Problem

It's suggested to do this before Problem 14.6.22, although you can do that problem without this one.

**Homework 6 Extra Problem.** Let  $p_k(x_1, \dots, x_n) = x_1^k + x_2^k + \dots + x_n^k$ . Let

$$E(t) = \sum_{r=0}^{\infty} s_r(x_1, \dots, x_n)t^r, \quad P(t) = \sum_{r=1}^n p_r(x_1, \dots, x_n)t^{r-1}.$$

*Prove that*

$$E(t) = \prod_{i=1}^n (1 + x_i t), \quad P(t) = \sum_{i=1}^n \frac{x_i}{1 - x_i t} = \sum_{i=1}^n \frac{d}{dt} \ln \frac{1}{1 - x_i t}.$$

Hint for Problem 14.6.22 (optional): compare  $P(t)$  with the logarithmic derivative of  $E(t)$ .