

## Homework 18

2) We want to show that  $h_i(x_1, \dots, x_n)$  is the coefficient of  $t^i$  in the Taylor expansion of  $\frac{1}{(1-x_1t)\dots(1-x_nt)}$ . We first note that  $\frac{1}{(1-x_jt)} = \sum_{i=0}^{\infty} x_j^i t^i$ , and so

$$\prod_{j=1}^n \frac{1}{(1-x_jt)} = \left( \sum_{i=1}^{\infty} x_1^i t^i \right) \dots \left( \sum_{i=1}^{\infty} x_n^i t^i \right) = \sum_{i=1}^{\infty} \sum_{k_1+\dots+k_n=i} x_1^{k_1} \dots x_n^{k_n} t^i = \sum_{i=1}^{\infty} h_i(x_1, \dots, x_n) t^i.$$