

1.2.9 - Generating Functions

April 11, 2021

$$G(z) = a_0 + a_1z + a_2z^2 + \dots = \sum_{n \geq 0} a_n z^n$$

In the above equation $G(z)$ is called *generating function* for sequence $a_0, a_1, a_2 \dots$

Condition for convergence of the series.

a)

b)

On the other hand the book says don't worry about convergence too much when we are working with generating functions, since we are only exploring possible approaches to solution of some problem.

A. Addition

$$\alpha \sum_{n \geq 0} a_n z^n + \beta \sum_{n \geq 0} b_n z^n = \sum_{n \geq 0} (\alpha a_n + \beta b_n) z^n$$

B. Shifting

C. Multiplication

D. Change of z

E. Differentiation and Integration

F. Known Generating functions

F. Extracting a coefficient