

Sheet 7

Free University of Berlin, WS 2007/08

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Assignments for the lecture PSSA
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Exercise 17 (Generating Functions). Derive the coefficients of the following generating functions:

1. $f(z) = (1 + z)^c$ with $c \in \mathbb{N}_{>0}$,
2. $g(z) = (1 - cz)^{-1}$ with $c \neq 0$

Exercise 18 (Return-Probability and Count Occurrences). Given an i.i.d. two-letter alphabet with $P(A) = p$ and a text of size 5 and the words $\{AA, AC\}$. Compute for each word:

1. the generating function for the return probability and the absence probability
2. the coefficients for $p = 1/3$. (Hint: In Maple, you can use the function `rgf_term` from the package `genfunc`.)
3. the generating functions for the inter-occurrence time and the waiting time till the k th occurrence
4. the generating function for the number of counts
5. try to solve for $p = 1/3$ (I guess, here you want to use the package `gfun!`).

Exercise 19 (Generating Function vs Exact). Compare the result of the above exercise with the result computed by the exact formula (derived a few lectures earlier) for

1. the absence probability
2. the number of counts