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Fundamentals of Reinforcement Learning

Programming Exercise 1

Task 1 – Programming: The Soft-Max Distribution

Study the Soft-Max distribution numerically by solving the following sub-tasks:

- Write your own MATLAB-function for generating a random sample from the Soft-Max distribution. Your function should take as input (i) a vector $z = [z_1, ..., z_k]^T$ consisting of k real numbers $z_1, ..., z_k$ and (ii) the size N of the random sample to be produced. As output, your function should produce a vector of N realizations of independent, identically distributed random variables that follow the Soft-Max distribution on $\{z_1, ..., z_k\}$.

- Generate a random sample with a large sample size N from the Soft-Max distribution on $\{1, ..., 10\}$.

- Plot the relative frequencies of the generated sample using the command `stem`. Compare the relative frequencies with the true PMF in the same plot.

- Try changing the value of N to see how results change.