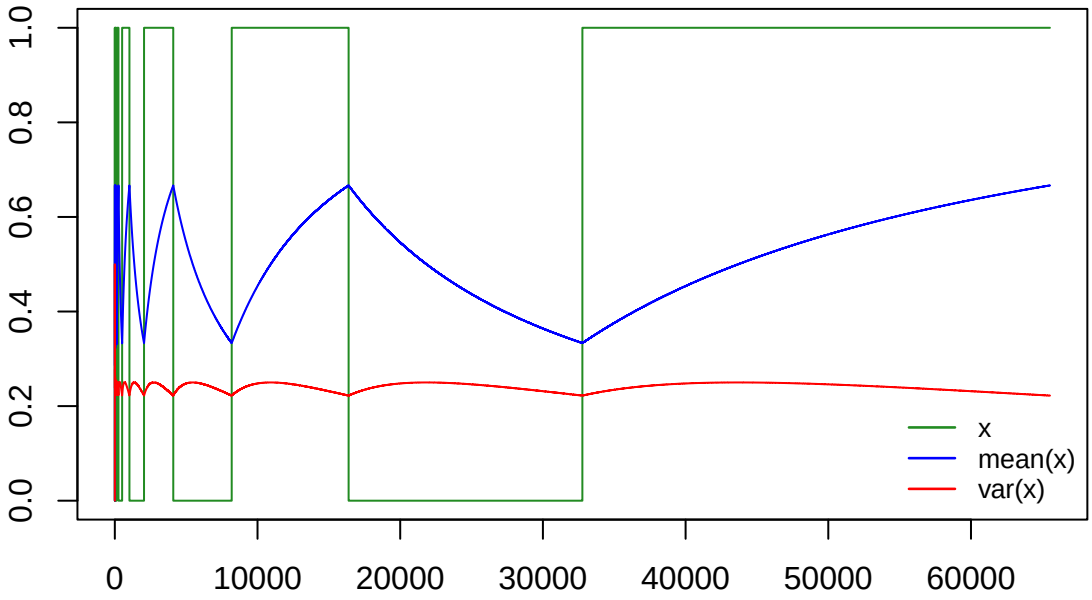
Process x

Oliver Snellman*

Nov 2023

A process with finite variance but non-converging mean

1. Initialize as x=0, y=0 and i=1
2. If y==1, set y=0, y=1 otherwise
3. Assign 2^i times the value y to x
4. Set i = i + 1
5. Repeat steps 2-4 indefinitely



*University of Helsinki, visiting University of Pennsylvania, oliver.snellman@gmail.com, www.oliversnellman.com

Same with a continuous function

$$y = \sin(\log(x^k))$$

where $k = 5$ only compresses the waves for visualization. The grey lines illustrate the infimum and supremum for the mean of y, which remain constant for all cutoffs of x.