Homework for Lecture 10 of Dr. Z.'s Dynamical Models in Biology class

Email the answers (as .pdf file) to

ShaloshBEkhad@gmail.com

by 8:00pm Monday, Oct. 13, 2025.

Subject: hw8

with an attachment hw8FirstLast.pdf and/or hw8FirstLast.txt

Using

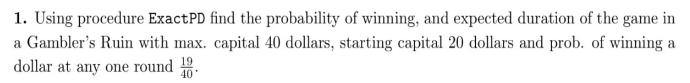
http://sites.math.rutgers.edu/~zeilberg/Bio25/DMB10.txt

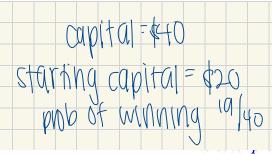
1. Using procedure ExactPD find the probability of winning, and expected duration of the game in a Gambler's Ruin with max. capital 40 dollars, starting capital 20 dollars and prob. of winning a dollar at any one round $\frac{19}{40}$.

Now using EstPD, estimate it with (i) K=100, (ii) K=1000 (iii) K=5000 (Warning: this may take some time) Which of them gives the best estimate? Can you explain why?

2.

Plot ForPD(n,100,p)[1] from p=0.45 to p=0.5 for n=10,20,30,40,50,60,70,80,90.





ExactPD
$$(20, 40, \frac{19}{40});$$

 $[0.1190277811,\,304.7777751]$

prodpility duration

Now using EstPD, estimate it with (i) K=100, (ii) K=1000 (iii) K=5000 (Warning: this may take some time) Which of them gives the best estimate? Can you explain why?

as K1, time phyram van 1

EstPD $(20, 40, \frac{19}{40}, 100);$

 $[\,0.1100000000,\,292.0600000\,]$

 $EstPD(20, 40, \frac{19}{40}, 1000);$

 $[\,0.1310000000,\,308.3000000\,]$

 $EstPD(20, 40, \frac{19}{40}, 5000);$

[0.1234000000, 307.1728000]

best estimate the #
of times simu(n,L,p)
nurs, and thun averages
the values. Therefore,
the nigher the k value,
the better the
estimate.

2.

Plot ForPD(n,100,p)[1] from p=0.45 to p=0.5 for n=10,20,30,40,50,60,70,80,90.

wiin(piois):

plot([seq(ForPD(n, 100, p)[1], n = [10, 20, 30, 40, 50, 60, 70, 80, 90])], p = 0.45..0.5);

