

Discrete Mathematics with Applications

F02 – Lecture 9

Lecture, March 25

The next technique we studied was the solution of linear recurrence relations. We introduced the Fibonacci numbers as solution of a recurrence relation of degree two. We presented the theory of solving degree two recurrence relations (sections 5.1 and 5.2).

Lecture, April 8

We'll start to lecture on discrete probability theory. We shall define sample spaces, events and elementary events as well as the axioms of discrete probability distributions and study their properties (Sections 4.4 and 4.5).

Lecture, April 15

Conditional probabilities are introduced and Bayes' theorem is proven. Then, random variables and expectation values for the latter are treated. (Sections 4.4, 4.5 and additional notes).

Problems to be discussed April 16

Problems from Section 4.4: 9, 12, 14, 31, 34

Additional problems:

Problems from Section 4.4: 13, 18, 22, 35

Maple problems

We want to check how randomly chosen integers are distributed. Towards this goal we use the command `randmatrix` which is available in Maple's linear algebra package (`with(linalg,randmatrix)`).

Create a random square matrix with 5 rows and columns and entries in $\{-3, -2, -1, 0, 1, 2, 3\}$ (take a look to the maple manual how to do that). Compute the average over all the entries in the matrix (i.e. sum up their values and divide by 25). Now repeat the same about say 100 times, sum up all the results you got and compute their average (i.e. divide the sum by the total number of attempts). What should you expect to realize? Check your expectation by running the same procedure several times using the `restart` facility; what can you realize then? What does that tell you about Maple's way to produce random numbers?

Next read the description of the command `randomize()` in connection with `Seed`. Include it into your earlier Maple program and check once again the behaviour.

Matalogifest

Information concerning the next Matalogifest can be found under

<http://www.imada.sdu.dk/~jones/matalogi/>