

Take Home Final

MATH G6071: Numerical Methods in Finance
Dave Bayer, April 24, 2000

[1] List each programming assignment that you have submitted for this course. Indicate roughly when it was submitted, whether it was submitted by email or physically, and whether it was an individual or group project. If you are expecting to submit an assignment shortly, indicate when I can expect it, and how I can reach you to find out its status.

Would you like your final grade to depend entirely on your programming assignments (any grade up to $A+$ is possible), entirely on this take home exam (any grade up to $A-$ is possible), or a combination (any grade up to A is possible)? Please state your reasoning. If you elect to be graded entirely on programming assignments, do not work any remaining problems on this exam.

[2] Describe various ways that a poor random number generator can cause unintended problems in use. How would you select and test a random number generator for production use?

[3] Explain the stochastic differential equation

$$\frac{dS}{S} = \sigma dX + \mu dt$$

in the context of finance.

[4] Compare the explicit, implicit, Crank-Nicolson, and Douglas finite difference methods for pricing options.

[5] Explain what a free boundary problem is, and how one prices an American option using the Projected SOR algorithm.

[6] Explain Richardson's deferred approach to the limit.