JDEP 384H: Numerical Methods in Business

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Department of Mathematics

Lecture 5, January 23, 2007
110 Kaufmann Center

Outline

1. Joint Random Variables

2. Vector Random Vectors

Some Conceptual Calculations

After examining the section on on joint random variables: Dart throws are independently of each other. X and Y are the location of the dart on $[0, 1]$.
Think about the following:

- What is the joint p.d.f. for these r.v.'s?
- What is the liklihood of achieving a "score" at most $1/2$?
- What is the expected value of the score?

A Bivariate Normal Distribution

After examining the ProbStatLecture section on vector random variables:

Asset evaluation (cf. text, p.85):

Two assets have rates of return R_1 and R_2 that are random variables with means 0.2 and 0.1, variances 0.2 and 0.4, respectively, and covariance -0.1. A weighted portfolio had rate of return $R_w = w_1 R_1 + w_2 R_2$. Think about the following and do some board work:

- What is the expectation and variance of $\mathbf{R} = (R_1, R_2)$?
- What is the expectation and variance of R_w?
- If R_1 and R_2 are jointly bivariate normal, what does the joint p.d.f. look like?
- Is there a weighting that would minimize volatility as measured by variance? If so, what would its rate of return be?

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