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
After examining the section 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 likelihood of achieving a “score” at most 1/2?
- What is the expected value of the score?
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?
A Bivariate Normal Distribution

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