

Homework 11 - Some hints and suggestions

December 2, 2004

Problem 12.3.2. Maybe it is better to first solve problem 12.4.5. Define an appropriate sequence of stopping times, and try a similar approach to that of the latter problem.

Problem 12.3.4. You might want to use the Borel-Cantelli lemma at some point.

Problem 12.4.4. Notice that $\sup_{m \leq n} Y_m \geq x \iff \exists k \leq n : Y_k \geq x$. Given this, define an appropriate stopping time.

Problem 12.4.5. Without loss of generality (explain why) you may look at $\mathbb{E}Y_S \leq \mathbb{E}Y_T$. Let $\mathbf{1}_m := \mathbf{1}_{\{S < m \leq T\}}$ and define $Z_n = \sum_{m=1}^n \mathbf{1}_m (Y_m - Y_{m-1})$. Use Z_n to get the result.