

Test I: February 14th, 2002

1. Topics Covered: (*I have tried to make this list as comprehensive as possible*)

- (a) Review of Basic probability (Borel Cantelli Lemma, Jensens/Chebyshev's inequality, independence,..)
- (b) Brownian motion (definition, construction, properties discussed)
- (c) Weak-convergence (Definition, applications to $\mathbb{R}^\infty, C([0, 1])$, determining class, convergence determining class, tightness)

2. Basic Results:

- (a) You may ignore(for this test): problems in assignment 4: 1(a),(b), 3.
- (b) Borel Cantelli
- (c) Construction of Brownian motion
- (d) Regularity of a probability measure on a metric space S
- (e) Determining classes.
- (f) Each probability measure on a metric space S is tight.
- (g) Equivalent definitions on weak convergence.
- (h) Finite dimensional sets
- (i) Theorem on mappings (i.e $\mathbb{P}_n \Rightarrow \mathbb{P}$ then when does $\mathbb{P}_n h^{-1} \Rightarrow \mathbb{P} h^{-1}$ and such..)
- (j) Need to understand how to determining when a subclass is a convergence determining class.(In Billingsley notation-Theorem 2.2 and Corollary 1)
- (k) All the problems given in the assignments.