IEOR 8100: Topics in OR: Asymptotic Methods in Queueing Theory

Fall 2009, Professor Whitt

Class Lecture Notes: Wednesday, September 30.

empirical distributions

Topics Covered

1. empirical distributions, the Kolmogorov-Smirnov statistic; see statistics books

2. Glivenko-Cantelli theorem; §5.5 of Chung.

3. empirical process; Wikipedia

4. Brownian bridge

5. justifying the Kolmogorov-Smirnov statistic; [B] §13 of 1968; [W] §2.2, many references. Historical: Doob (1949), Donsker (1952).

6. Brownian sheet; see Appendix of IS paper (G. Pang & WW, "Two-Parameter Heavy-Traffic Limits for Infinite-Server Queues." Submitted to *Queueing Systems*).

7. Kiefer process; see Appendix of IS paper

8. sequential empirical process

9. Applications to infinite-server (IS) queues with general service-time cdf's; the IS paper

10. Representation for the two-parameter queue-length processes $Q_n^r(t,y)$ and $Q_n^e(t,y)$; §2 of IS paper.

11. Guodong's seminar on Friday.

12. Then to the fluid approximation & WW (2006).