Exercise Sheet 6

Performance Modeling of Distributed Systems

Winter Term 2013/2014

Assignment 1 (Network Analysis)
Assume a dynamic S-server and two incoming flows A_1 and A_2. Consider flow A_1 to have priority over A_2, i.e. the service A_2 receives, is the leftover service, which results after serving A_1. Derive the backlog bound for A_2 for the case that

- S, A_1 and A_2 being $\sigma(\theta), \rho(\theta)$-bounded.
- S, A_1 and A_2 being tailbounded.

Hint: A_1 and A_2 are not assumed to be stochastically independent!

Assignment 2 (An Lower Output Bound)
Assume a dynamic S-server to be $(\sigma_S(\theta), \rho_S(\theta))$-bounded and a flow A to be $(\sigma_A(\theta), \rho_A(\theta))$-bounded, with $-\rho_S(\theta)\,\rho_A(\theta)$. Derive for a fitting σ the following lower output bound for the departure process D:

$$\mathbb{E}(e^{-\theta D(m,n)}) \leq e^{\theta\sigma(\theta)-\rho_A(\theta)(n-m)}$$