ETH
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Distributed Computing

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Discrete Event Systems

Exercise Sheet 15

1 Network Calculus

Given a rate function R, functions α, β and the min-plus-convolution $\otimes$ from the lecture, prove the properties on slide 6/17:

a) If $R \leq R \otimes \alpha$ holds, α is an arrival curve.

b) If $R^* \geq R \otimes \beta$ holds, β is a service curve.

2 FIFO Calculus

In the lecture, it was shown that FIFO is instable for $r > 0.85$ (slides 6/27ff). The proof ends on slide 6/34 with the statement that the node in the bottom left now holds $r^3 s + r^2 s/(r+1) > s$ packets. Is the proof really complete now? Or do you still have to prove that a burst might happen as in the beginning? Justify your answer!

Hint: In case the lecture has not proceeded far enough, you might want to leave out this exercise.