TCP Fairness

Fairness goal: if K TCP sessions share same bottleneck link of bandwidth R, each should have average rate of R/K
Why is TCP fair?

Two competing sessions:
- Additive increase gives slope of 1, as throughout increases
- Multiplicative decrease decreases throughput proportionally
**Fairness (more)**

**Fairness and UDP**
- Multimedia apps often do not use TCP
  - do not want rate throttled by congestion control
- Instead use UDP:
  - pump audio/video at constant rate, tolerate packet loss
- Research area: TCP friendly

**Fairness and parallel TCP connections**
- nothing prevents app from opening parallel connections between 2 hosts.
- Web browsers do this
- Example: link of rate R supporting 9 connections:
  - new app asks for 1 TCP, gets rate R/10
  - new app asks for 11 TCPs, gets R/2!