

2011 Paper 9 Question 9

Principles of Communications

- (a) Control Theory allows us to find various useful properties of a system such as stability. Draw a picture of a generic control system, explaining the functions of *feedback* and the design goals for the *controller*. [5 marks]
- (b) The Transmission Control Protocol of the Internet uses a feedback controller and responds to absence or presence of congestion signals by *Additive Increase Multiplicative Decrease* of a sending window.
- (i) Describe the operation of this scheme. [10 marks]
- (ii) Explain qualitatively why the scheme is necessary, but perhaps not sufficient, to create a stable set of traffic flows in the Internet. [5 marks]