City University of Hong Kong
Department of Electrical Engineering

EE3009 Data Communications and Networking

Tutorial 5

1. Prove that, with Stop-and-Wait ARQ, the average total time to transmit a frame is given by

$$E[t_{SW}] = t_0 + \frac{t_{out} P_f}{1 - P_f}$$

where t_0 is the frame transmission time, t_{out} is the time out period and P_f is the frame transmission error.

2. A telephone modem is used to connect a personal computer to a host computer. The speed of the modem is 56 kbps and the one-way propagation delay is 100 ms. Assume that $n_0 = n_a = t_{proc} = 0$.

   i) Find the efficiency for Stop-and-Wait ARQ if the frame size is 256 bytes, assuming a bit error rate of 10^{-4}.
   ii) Find the efficiency of Go-Back-N if three-bit sequence numbering is used with frame sizes of 256 bytes. Assume a bit error rate of 10^{-4}.