Assignment 7

A real-time system has 5 independent interrupts occurring 1, 2, 3, 4, and 5 % of the time:

1) What is t'(s) in terms of t(s)?

$$t'(s) = t(s)/[1 - .01 - .02 - .03 - .04 - .05]$$

2) If t'(s) = t(s) + 5 sec for each of the above interrupts when the other 4 are turned off, what is t'(s) for each case? (You should get a number for each.)

(1) $t' = (t' - 5)/(1 - .01) \Rightarrow t' = 500$

(2) $t' = \ldots \ldots .02) \Rightarrow t' = 250$

(3) $t' = \ldots \ldots .03) \Rightarrow t' = 167$

(4) $t' = (t' - 5)/1 \ldots .04) \Rightarrow t' = 125$

(5) $t' = \ldots \ldots .05) \Rightarrow t' = 100$

3) What is the frequency of each interrupt in units of hertz in terms of t(I) for each interrupt (I=1-5) when the other 4 are turned off?

$$f_I = (.01 * I)/t(I)$$

4) In question 2, if the 2% frequency interrupt becomes nested inside the 1% frequency interrupt, what is t'(s) for each of these 2 interrupts.

$t' = (t' - 10)/[1 - .01 - .02]$ $\quad \frac{10}{.03} = t' = 334$

5) The interrupt latency is 10 usec, the ISR time is 110 usec, the dispatch latency is 20 usec, and the task pointed to by the ISR is 50 usec. What is this interrupt task's response time in this case?

$10 + 110 + 20 = 140$ usec