**HW-5-GK-Ch-17**

**17.8: Sketch a configuration consisting of two integral discriminators and an anticoincidence unit that will perform the function of a single-channel analyzer.**

**17.11: Pulses corresponding to a particular full-energy peak occur at a rate of 8000/s in a system in which the total pulse rate is 25,000/s. Estimate the fraction of the full-energy events that are lost due to pile-up, if the effective pulse width is 4 μs.**

**17.15: Random and uncorrelated pulses are supplied at rates r1 and r2 to the inputs of an anticoincidence unit with resolving time τ. Taking into account the effects of chance coincidences, what should be the observed output rate?**

**17.20: The following data were obtained for the coincidence-**

**delay curve in a coincidence experiment:**

**(a) What is the resolving time of the coincidence unit?**

**(b) What is the width of the prompt coincidence peak in the time spectrum?**

**(c) What is the singles rate, assuming that it is about the same in both branches supplied to the coincidence unit?**

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**17.21: A 12-bit subranging ADC can consist of 3 stages of 4 bits each, or 4 stages of 3 bits each. Which configuration requires the smaller total number of comparators? If both configurations were operated at the same clock frequency,**

**which would have the lower latency time?**

**17.22: The digital equivalent of a step input voltage consists of sampled data V(i) = 0 for i < 0 and V(i) = 1 for i ≥ 0. Find the first five nonzero terms for the output of a digital filter applied to these data that consists of the following weighting factors:**

**(a) A "moving average" or "box car filter" of H(0) = H(l) = H(2) = H(3) = 0.25**

**(b) A "differentiator" with H(0) = 1, H(l) = -1**

**(c) A "differentiator with memory" of H(0) = H(l) = 0.5; H(2) = H(3) = -0.5**

**(d) An "exponential integrator" with H(i) = 0 for i < 0 and i > 5; H(i) = exp(-i/2) for 0 ≤ i≤ 5**