Assignment 1

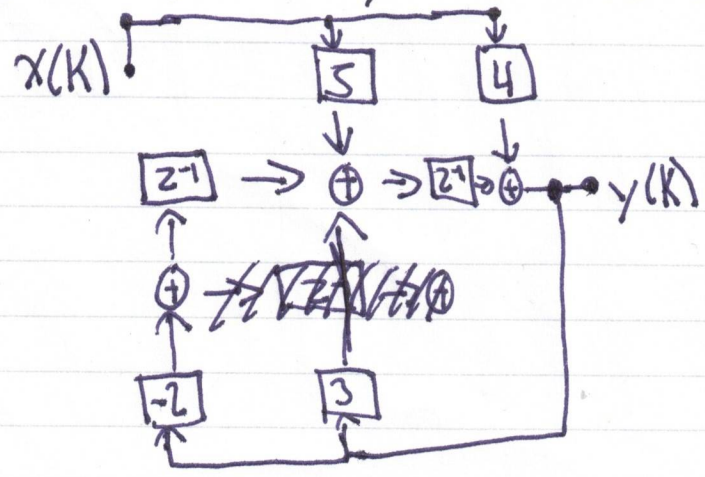
Darren Morrison Sept 27

1. a) $x(K) = \max(K, 0)$. Causal, zero valued for $K<0$
   b) $x(K) = \sin(.2\pi K)\mu(-K)$. Non-causal, Signal exists for $K<0$
   c) $x(K) = 1 - \exp(-K)$, Non-Causal, Signal exist for $K<0$
   d) $x(K) = \text{Mod}(K, 10)$. Non-Causal, Signal exists for $K<0$
   e) $x(K) = \tan(\sqrt{2}\pi K)[\mu(K) + \mu(K-100)]$. Causal, zero-valued $K<0$
   f) $x(K) = \cos(\pi K) + (-1)^K$. Non-Causal Signal exists for $K<0$
   g) $x(K) = \sin(.5\pi K)/(1+K^2)$. Non-Causal, Signal exists for $K<0$

2. a) $x(K) = K\cos(.1\pi K)/(1+K^2)$. Bounded
   b) $x(K) = \sin(.1K)\cos(.2K)\delta(K-3)$ Bounded
   c) $x(K) = \cos(\pi K^2)$ Bounded
   d) $x(K) = \tan(.1\pi K)[\mu(K) - \mu(K-10)]$ unbounded
   e) $x(K) = K^2/(1+K^2)$ Bounded
   f) $x(K) = K\exp(-K)\mu(K)$ Bounded

3. a) $y(K) = y(K-1) - 2y(K-2) + x(K) + x(K-1)$. Causal. No future values
   b) $y(K) = y(K-1) + x(K+1) + 2x(K) - x(K+1)$ Non-Causal, future values
   c) $y(K) = x(K) - x(K-1)$ where $x(K) = \exp(K+1)$ Causal, No future values

4. $y(K) = 3y(K-1) - 2y(K-2) + 4x(K) + 5x(K-1)$



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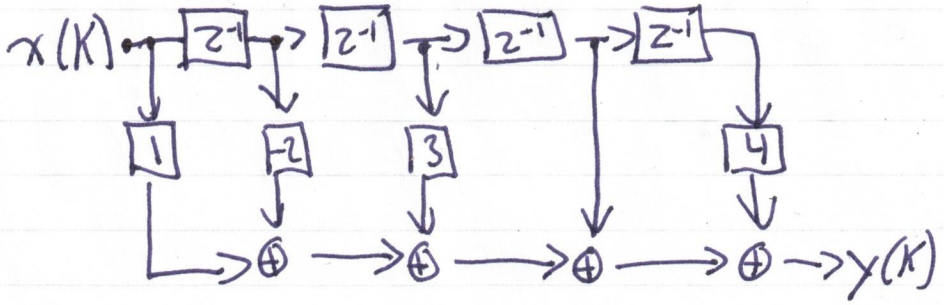
5. $y(K) = x(K) - 2x(K-1) + 3x(K-2) - 4x(K-4$



6. Question 5 is an FIR as it only has x-terms.
IIR (Question 4) has y and x-terms.