DLTI Difference Equation

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Causal LTI Systems

$$a_N y[n-N]+\cdots+a_1 y[n-1]+a_0 y[n] \;=\; b_M x[n-M]+\cdots+b_1 x[n-1]+b_0 x[n]$$

$$y[n]+a_1 y[n-1]+\cdots+a_{N-1} y[n-N+1]+a_N y[n-N] \;=\; b_0 x[n]+b_1 x[n-1]+\cdots+b_{N-1} x[n-N+1]+b_N x[n-N]$$

$$Q[E]y[n] \;=\; P[E]x[n]$$

- **Zero Input Response**
- **Zero State Response (Convolution with h(t))**

- **Natural Response (Homogeneous Solution)**
- **Forced Response (Particular Solution)**

References

[1] http://en.wikipedia.org/
[2] J.H. McClellan, et al., Signal Processing First, Pearson Prentice Hall, 2003
[3] B.P. Lathi, Linear Systems and Signals (2nd Ed)