Problem Wk.3.3.4: Representations

Derive the operator equation and difference equation for each of the LTI systems given by the block diagrams below.

A difference equation is in the form:

$$y[n] = c_0 y[n-1] + c_1 y[n-2] + \ldots + c_{k-1} y[n-k] + d_0 x[n] + d_1 x[n-1] + \ldots + d_j x[n-j]$$

To specify difference equations, enter sequences of coefficients for the `y` terms and a separate sequence of coefficients for the `x` terms. **Do not enter any commas, just numbers separated by spaces.** Specify the `dCoeffs`: $d_0 \ldots d_j$ and the `cCoeffs`: $c_0 \ldots c_{k-1}$ for each of the difference equations below. For each question, enter a sequence of numbers representing the coefficients.

If one set of coefficients is empty, enter `none`, otherwise enter a sequence of numbers separated by spaces (no commas, parens, brackets, etc).

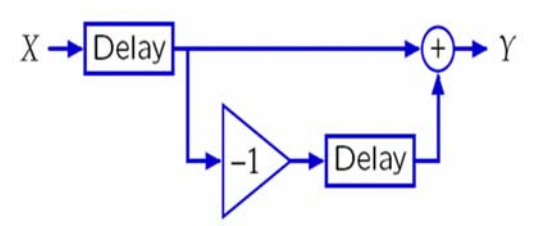
Operator equation: The equation is expressed as:

$$a_0 y + a_1 R y + a_2 R^2 y + \ldots = b_0 x + b_1 R x + \ldots$$

The first entry in the sequence of Ry coefficients is for the constant term ($R^0 y$), then for the Ry term ($R^1 y$), then for the $R^2 y$ term, and so on. Same for the Rx coefficients, start with the $R^0 x$ term.

If one set of coefficients is empty, enter `none`, otherwise enter a sequence of numbers separated by spaces (no commas, parens, brackets, etc).

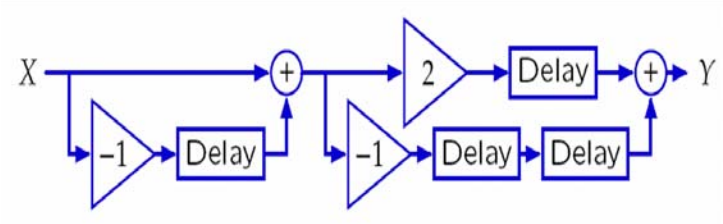
1.



Difference equation:
dCoeffs: cCoeffs:

Operator equation:
Rx coeffs: Ry coeffs:

2.



Difference equation:
dCoeffs (input): cCoeffs (output):

Operator equation:
Rx coeffs: Ry coeffs:

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