

# Problem Wk.5.1.4: Feedback Subtract Expression

For the system below, assume that each system function is defined by the ratio of polynomials shown below:

$$H_1 = n_1/d_1$$
$$H_2 = n_2/d_2$$

where each of  $n_1, n_2, d_1, d_2$  is a polynomial in  $R$ .

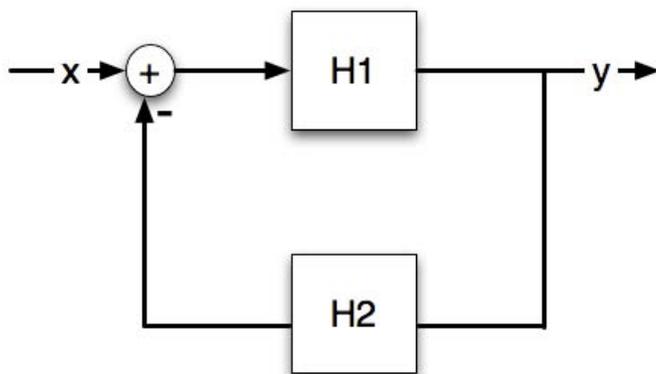
When we use feedback composition of these system functions, we create a new system function that can also be expressed as a ratio of polynomials. For the composite system below, enter an arithmetic expression involving the  $n$ 's and  $d$ 's for each of the numerator and denominator polynomials.

- Make very sure that you use the underscores in the names of the variables, that is,  $n_1$ , not  $n1$  or  $n-1$ .
- You need to enter both the numerator and denominator before you can check either. They will be checked together. The check will be on whether the ratio is correct, not whether the individual parts are correct.
- The numerator and denominator can involve additions, subtractions and multiplications, but no divisions.
- You can use parens as necessary in your expressions.

You can enter algebraic expressions in "standard" notation; the checker will try to turn your input into a valid Python expression. An example answer is something like:

$$(n_1 d_1) + n_2$$

If you're having trouble with syntax, you can always type a legal Python expression, fully parenthesized and with all the operators, including  $*$ .



Numerator:

Denominator:

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