# s_d_filter_z2_p2 (subcircuit)

## Attributes

```
inputs: x
outputs: y
e_left_nodes:
e_right_nodes:
e_top_nodes:
e_bottom_nodes:
b_left_nodes:
b_right_nodes:
b_top_nodes:
b_bottom_nodes:
parameters:
  a0: 1
  a1: 1
  a2: 1
  b0: 1
  b1: 1
  b2: 1
  sampler_index: 0
```

## Description

`s_d_filter_z2_p2` is a digital (discrete) filter with `x` as input and `y` as output. The input is expected to be a sampled quantity. `s_d_filter_z2_p2` implements the following transfer function.

$$H(z) = \frac{b0 + b_1 z^{-1} + b_2 z^{-2}}{a0 + a_1 z^{-1} + a_2 z^{-2}} \,. \tag{1}$$

The parameter `sampler_index` is the `index` value assigned to the `sampler_1.xbe` block which performs the sample-and-hold operation associated with the input `x`.