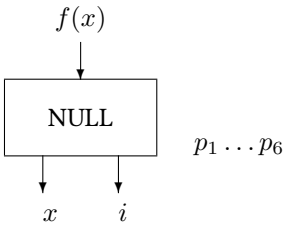
Block NULL

The NULL block searches a root of a continuous function.





Name	NULL
Function	fb0054
Inputs	1
Outputs	2
Parameters	6
Strings	0
Group	L

Inputs

1 Signal $y = f(x)$, which corresponds to the output x

Outputs

1 Signal x which is varied iteratively until $y = 0 \pm \Delta y_{\text{max}}$. This output has to be connected to a corresponding TOL block.

2 Indicator i for iteration failure
- 0 Solution found
- 1 Too many iterations
- 2 Both function values positive at boundaries
- 3 Both function values negative at boundaries
- 4 Found trivial solution

Parameters

1 Mode
- 0 Involution algorithm (in the current version this is the only option)

2 Lower limit x_{min} of the iteration interval

3 Upper limit x_{max} of the iteration intervall

4 Tolerance Δy_{max} for the accuracy of the calculated root

5 Maximum number N_{max} of iterations

6 Output value for x which is returned when the number N_{max} of iterations is reached or no solution was found within the iteration interval

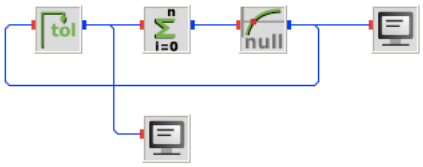
Strings

None

Description

The block determines the root of a function by different algorithms which can be set via the block's first parameter. The output x is changed iteratively until y is equal to $0 \pm \Delta y_{max}$.

null.vseit



A POLYN block provides the function $y = x^2 - 1$. The NULL block in combination with the TOL block finds the root of the function by the involution algorith in the interval $[0, 5]$. The SCREEN block, which is connected directly with the output off the TOL block displays all iteration steps. The SCREEN block which is connected to the NULL block displays the solution only.

```
0.0000000000
5.0000000000
2.5000000000
1.2500000000
0.6250000000
0.9375000000
1.0937500000
1.0156250000
0.9765625000
0.9960937500
Solution x = 0.9960937500
```

Remarks

The iteration intervall may contain only a single root.