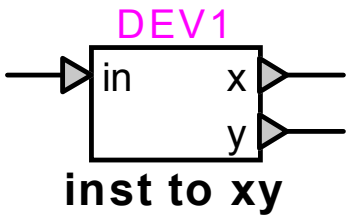
Phasor operation : instantaneous to (x,y)



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1 Description

This device converts the first harmonic of the instantaneous value of a signal to an (x,y) phasor representation. The (x,y) representation consists of the x-y coordinates of the phasor in a reference frame rotating at the base frequency.

1.1 Pins

This device has three pins:

pin	*type*	*description*	*units*
in	input pin	probed signal	any
x	output pin	phasor x-coordinate	same as input
y	output pin	phasor y-coordinate	same as input

1.2 Parameters

The following parameter must be defined:

parameter	*description*	*units*
freq	rotation frequency of the phasor reference frame	Hz

1.3 Input

The input pin may be connected to any control signal.

1.4 Output

The output is the (x,y) phasor representation of the first harmonic of the instantaneous value of the probed signal. The (x,y) coordinates are the *x*-axis and *y*-axis projections of the phasor on a rotating reference frame.

The x-y coordinates of the phasor in that reference frame are calculated over a sliding time window of period equal to *1/freq*, as follows:

$$x = \frac{2}{\text{period}} \cdot \int_{t-\text{period}}^{t} in(t) \cdot \cos(2\pi \cdot \text{freq} \cdot t) \cdot dt$$
$$y = \frac{2}{\text{period}} \cdot \int_{t-\text{period}}^{t} -in(t) \cdot \sin(2\pi \cdot \text{freq} \cdot t) \cdot dt \qquad (1)$$

The negative sign for *y* follows the engineering convention for an inductive (lagging) current to have a negative angle when phasor rotation is counterclockwise.