

## average\_mv.gce

### Attributes

```
mainvars: x_in x_out x_cntrl
iparms: n_samples=20 index=1
rparms: delt=1
```

### Description

`average_mv.gce` can be used to produce a “moving average” of a signal `x_in`, with the general variable `x_out` as its output. A clock signal at `x_cntrl` is used to sample the input `x_in`. The samples are averaged to produce `x_out`, a “moving average” since it gets updated at every clock cycle. Typically, one would keep the clock period much smaller than the time period over which the average value is desired. The parameters have the following meaning:

**n\_samples:** Number of samples for which `x_in` is to be averaged.

**index:** Index of the element. If more than one elements of this type are used in the circuit file, they should be assigned different index values.

**delt:** Time interval between the clock pulses applied at `x_cntrl`.

AC behaviour is not implemented.

The following circuit file shows how `average_mv.gce` can be used. The output obtained is shown in Fig. 1.

```
title: testing of average_mv.gce and rms_av.gce
greal t1=0.01m t2=0.09m t1pt2=0.1m
ginteger n_samples=10

begin_circuit
# triggering pulses:
  gelement type=clock y=y g_high=1
+   t1=t1 t2=t2 dt1=0.001m dt2=0.001m i0=1 t0=0

# a small triangle wave superimposed on a large sine wave:
  gelement type=vsrcac vxn=x1 a=1 f_hz=50 t0=0 phi=0
  gelement type=triangle_2 y=x2 i0=0 tperiod=1m t0=0.25m
+   g_high=0.05 g_low=-0.05 epsl=1u
```

```

gelement type=sum_2 x1=x1 x2=x2 y=x

# moving average and rhs meters:
gelement type=average_mv x_in=x x_out=x_avg x_cntrl=y
+   delt=t1pt2 n_samples=n_samples index=1
gelement type=rms_mv      x_in=x x_out=x_rms x_cntrl=y
+   delt=t1pt2 n_samples=n_samples index=1

outvar:
+   x=var_of_x
+   x_avg=var_of_x_avg
+   x_rms=var_of_x_rms
+   y=var_of_y
end_circuit

begin_solve
    solve_type=startup
    initial_sol initialize
end_solve

begin_solve
    solve_type=trns
    initial_sol previous
    begin_output
        filename=avg2a_gce.dat limit_lines=100000
        variables: x x_avg x_rms y
    end_output
    method: itmax_trns=100000
+   back_euler=yes
+   t_start=0 t_end=60m delt_const=0.02m delt_min=0.1u
+   n_wrtiterno=1000
end_solve

end_cf

```

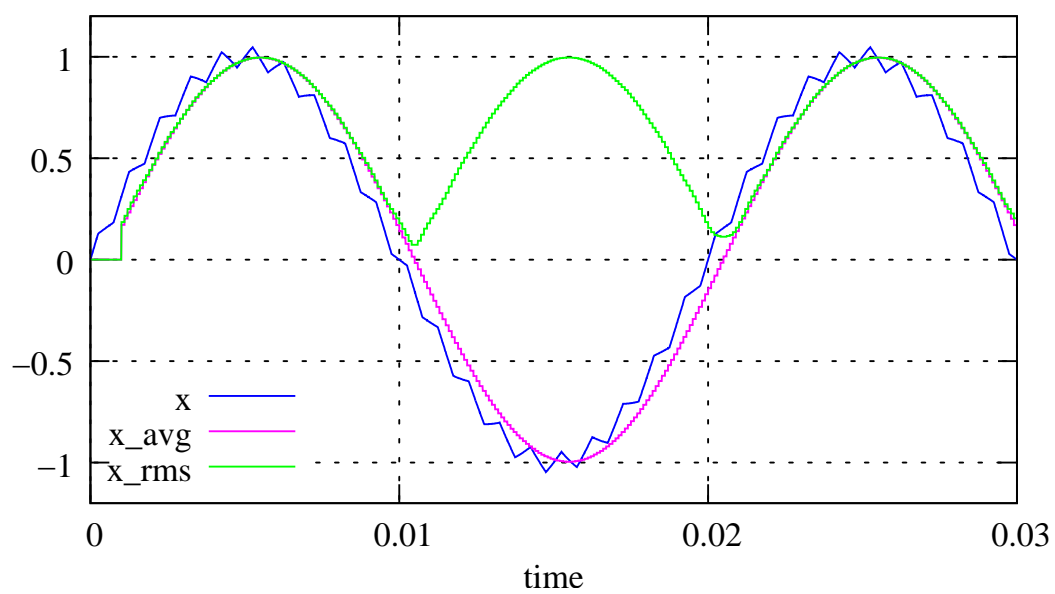


Figure 1: Waveforms obtained with `average_mv.gce`.