



SCICOS

by

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[How to run Scicos?]

Scilab Connected Object Simulator

```
--->scicos
```

```
// This command opens up an empty Scicos diagram named by  
    default Untitled
```

To open an existing diagram

```
---> scicos <filename>.cos
```

[Palettes

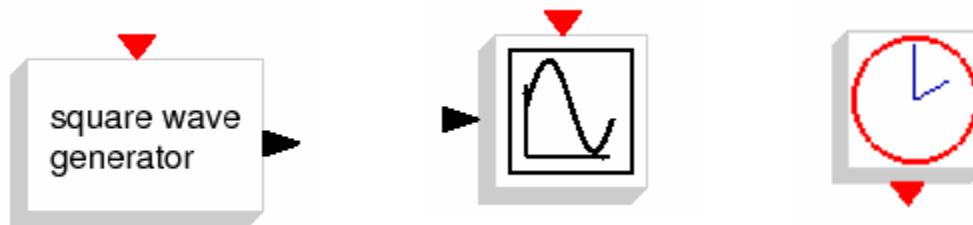
- Elementary blocks arranged in different palettes

- Sources
- Sinks
- Linear
- Non_linear
- Matrix
- Integer
- Events
- Threshold
- Others
- Branching
- Electrical
- ThermoHydraulics
- OldBlocks
- DemoBlocks

[Try this ...simple example]

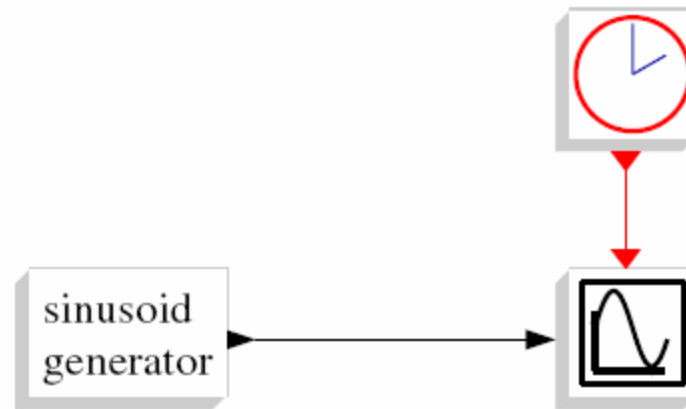
■ Signal Generator:

1. Copy following blocks

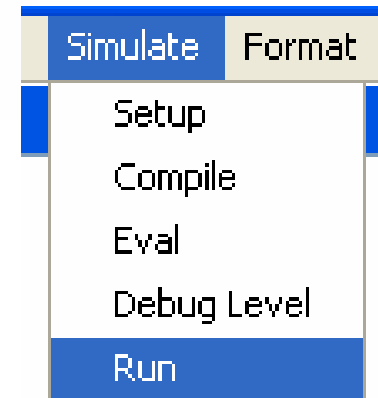


cont...

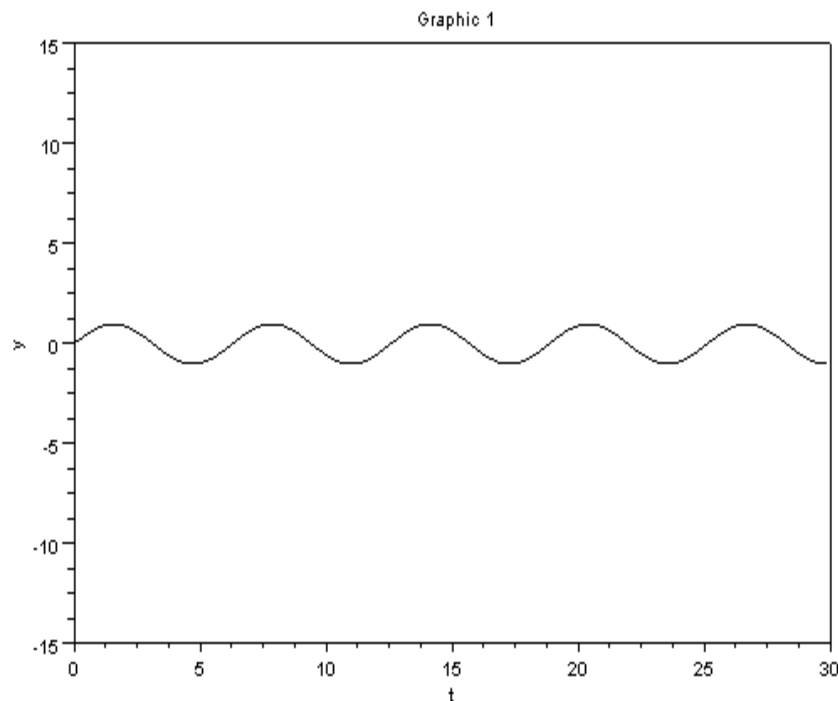
2. Completed Scicos Diagram



3. Click Run



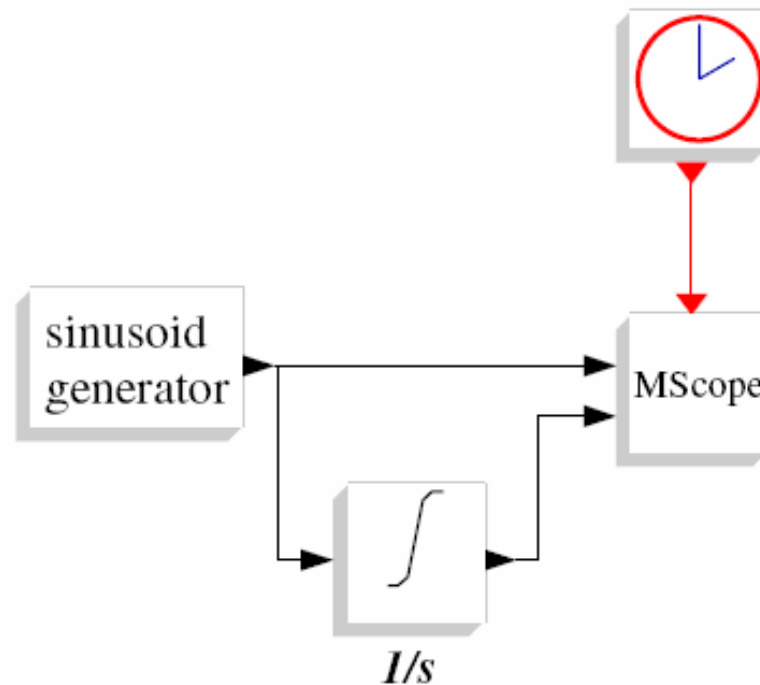
[Scope window]



- Default simulation time is very large.
- For this we can set upto 30.
- Use 'Stop' button, for simulation ending

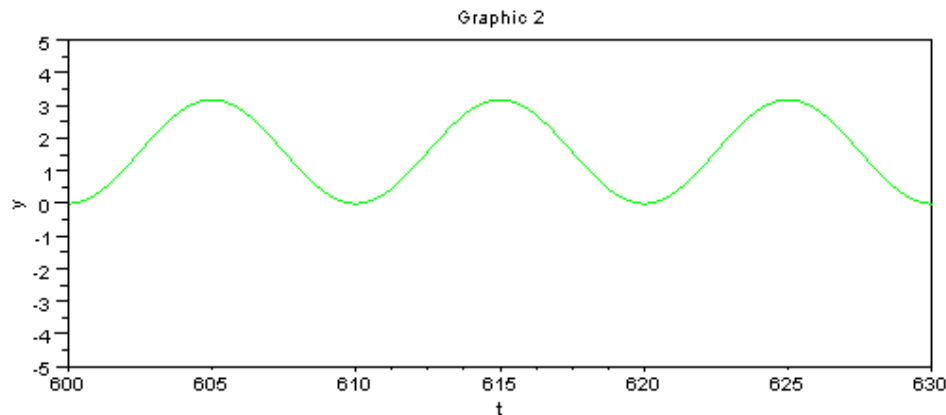
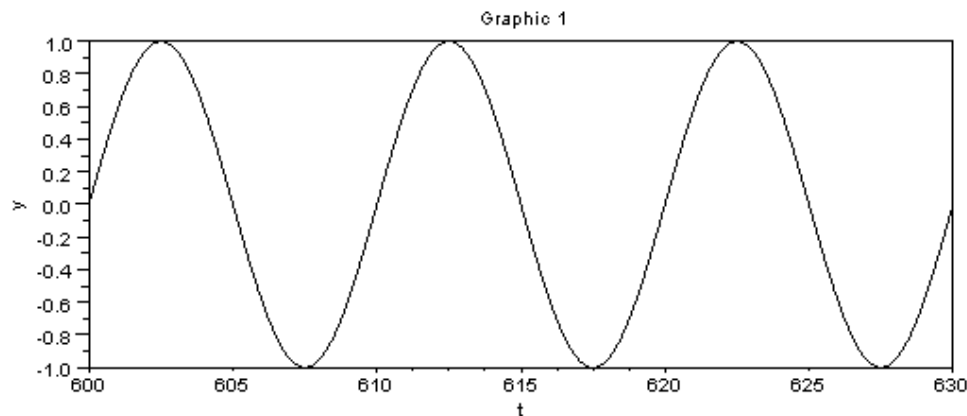
[Modified Scicos Diagram]

- Add integrator block:



[Set Parameter

- Set new frequency : $2 \times \pi / 10$



[A continuous-time state-space linear system]

$$\dot{x} = Ax + Bu,$$

$$y = Cx,$$

where A , B , C are constant matrices.

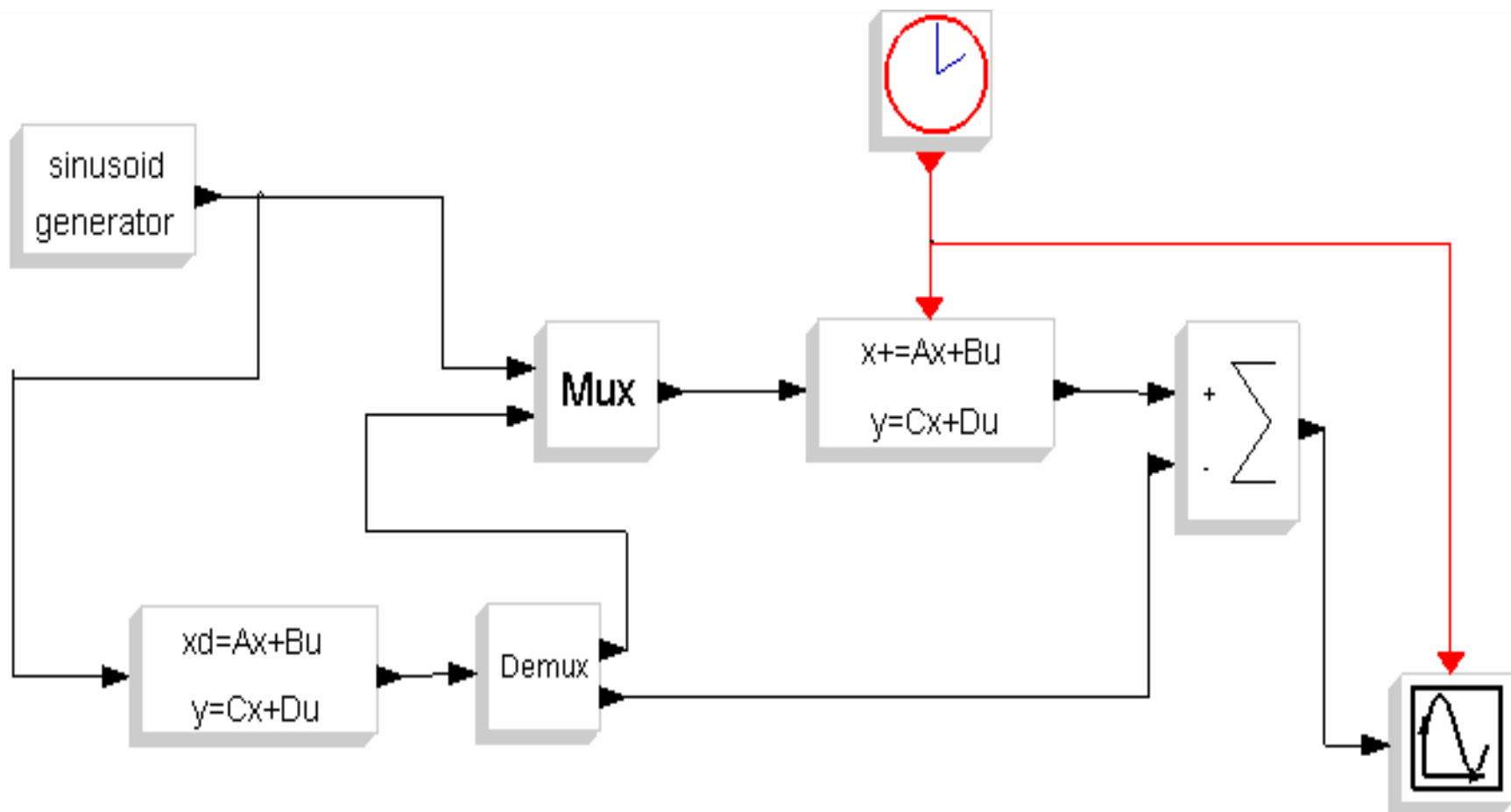
A continuous-time observer can be constructed as follows:

$$\dot{\hat{x}} = A\hat{x} + Bu + K(y - C\hat{x}).$$

- Value of K Chosen such that :
eigenvalues of $A - KC$ have negative real parts.
- Error value must tends to zero:
the estimation error $\tilde{x} = \hat{x} - x$

- Discrete-time (sampled data) observer is obtained by first constructing the corresponding continuous-time observer using ***pole-placement*** and then ***discretizing*** it.
- Now, we begin by taking random generated matrices

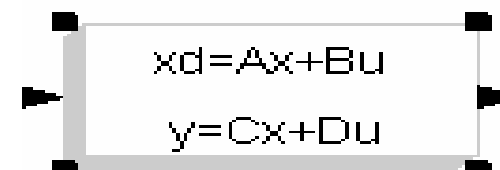
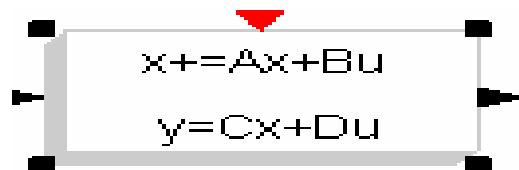
[System Observer Diagram]



```
n=5;m=2;dt=.2;
A=rand(n,n);A=A-max(real(spec(A)))*eye()
B=rand(n,1);C=rand(m,n);D=zeros(m,1);
x0=rand(n,1);
K=ppol(A',C',-ones(x0))';
Ctr=syslin('c',A-K*C,[B,K],eye(A),zeros([B,K]))
Ctrd=dscr(Ctr,dt)
[Ad,Bd,Cd,Dd]=abcd(Ctrd)
```

Here Control Commands are : spec, ppol, syslin,
dscr, abcd

Input to system: i.e. u , $\sin(t)$



Scilab Multiple Values Request

Set discrete linear system parameters

A matrix

B matrix

C matrix

D matrix

Initial state

Cancel OK

Scilab Multiple Values Request

Set continuous linear system parameters

A matrix

B matrix

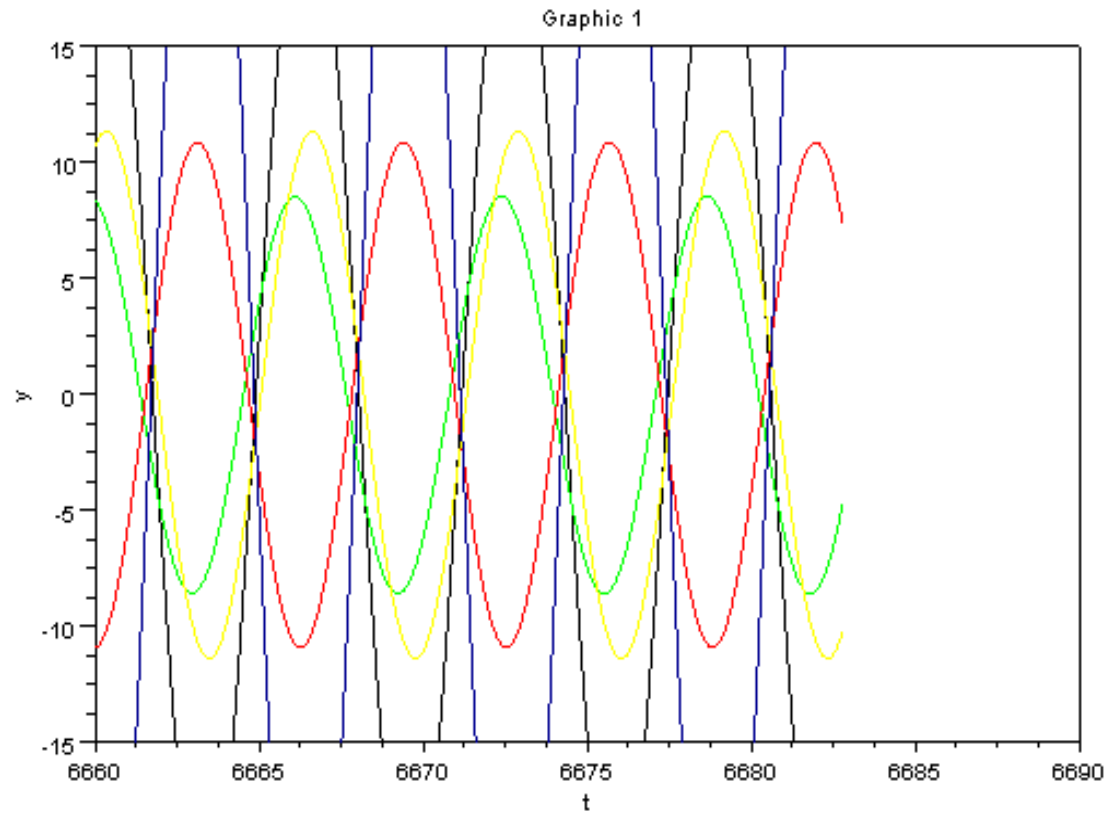
C matrix

D matrix

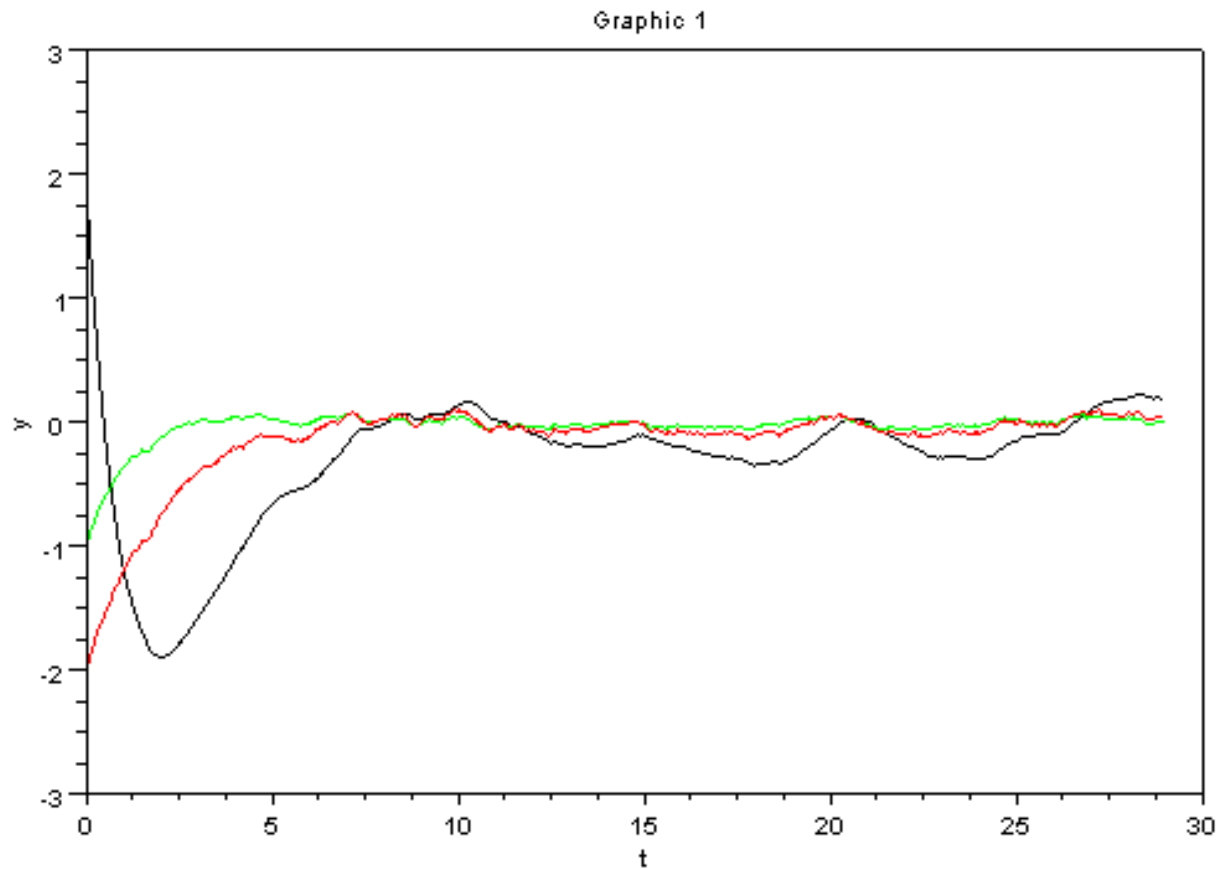
Initial state

Cancel OK

[Scope Window]



[Demo – System Observer



[References

- <http://www.scicoslab.org/>
- <http://www.scicos.org/>
- BOOK: “Modeling and Simulation in Scilab/Scicos”
by Stephen, L. Campbell, Jean-Philippe Chancelier
and Ramine Nikoukah, (Springer)

The text "THANK YOU" is displayed in a large, bold, sans-serif font. Each letter is filled with a different color from a rainbow gradient: 'T' is purple, 'H' is magenta, 'A' is red, 'N' is orange, 'K' is yellow, 'Y' is green, and 'O' is blue. The text is set against a white background and casts a soft, grey shadow to its left and slightly forward. To the right of the word "YOU" are three vertical purple bars of equal height, arranged in a row.

THANK YOU