

Simulation of a 6th order plant - PID controller closed-loop system with automatic on-line controller gain optimization.

VisSim is a visual simulation environment for modeling the behavior of linear, nonlinear, continuous time, discrete time, SISO, MIMO, multi-rate, and hybrid system designs on the Windows 3.1, 95, and NT platforms.

VisSim offers a uniquely integrated approach to model construction, simulation, validation, and optimization, which leads to rapid prototyping, faster execution, and greater productivity. Furthermore, because VisSim eliminates traditional programming, all modeling and simulation tasks can be accomplished *without writing a line of code*.

VisSim has proven its value on thousands of engineering projects, spanning a wide range of industries and disciplines, including precision motion control, continuous processes, automotive, HVAC, chemical processes, pulp and paper, nuclear power, missile guidance systems, hydraulic activators, and closed-loop control. Whatever your dynamic simulation needs may be, VisSim is there for you.

## Modeling Highlights

- 110+ mathematical, engineering, and scientific blocks with linear and nonlinear support
- Toolboxes: controls, electromechanical, Padé approximations, signal generation and processing
- Component libraries: DSP, dynamic, electromechanical, electrical, hydraulic, process and chemical, thermal, turbines
- Drag-and-drop block diagram construction
- Large model development
  - Explorer window for easy navigation
  - Hierarchical model structure with password protection
  - Embedded subdiagrams
  - Auto check for complete wiring
  - Connector labels with class names
  - Global, local, and scoped variables
  - Find and replace variables
- Vector and matrix operations
- FIR and IIR filter design
  - Bessel, Chebyshev, Butterworth, and Inverse Chebyshev
  - Differentiator and Hilbert transform design
  - Optional "tapped delay" implementation for discrete filters
  - Coefficient and filter method display
- Data I/O in ASCII, .M, .MAT, and .WAV formats
  - Data logging with gating
  - Custom data column separators
- DLL interface to create custom blocks written in C, Fortran, Pascal, or Visual Basic
- DDE with Copy Link and Paste Link
- Customizable toolbar
- Windows Clipboard support

## Simulation Highlights

- Continuous, discrete-time, MIMO, SISO, multi-rate, and hybrid simulation
- Interactive, batch, auto-restart, and single-step execution modes
- Euler, trapezoidal, Runge Kutta 2nd and 4th orders, adaptive Runge Kutta 5th order, adaptive Bulirsch-Stoer, and stiff backward Euler integration algorithms
- MIMO stateSpace and transferFunction blocks for ABCD matrices
  - User-specified
  - Imported from MatLab® .MAT or .M files
- Simulation control panel
- Parameter optimization with Powell, Polak-Ribiere, Fletcher-Reeves, or user-written optimizer
- 1-D, 2-D, and 3-D look-up tables
- Connector value probe with scalar, vector and matrix support
- State checkpointing
- Error highlighting
- Implicit system solving with Newton-Raphson or user-written optimizer
- Data typing and propagation with overflow checking for fixed point simulations
- Automatic conversion of s- and z-domain transfer functions

## Visualization Highlights

- Interactive plots and strip charts
  - XY\*, time domain, FFT, and discrete plots
  - Log, semi-log and linear scales
  - Automatic Y scaling and selectable time axis scaling
  - Multi-XY traces
  - Over plotting\* and plot zooming\*
  - Color coding, geometric markers, and labels
  - Custom background and foreground colors
  - Save data in ASCII, .M, .MAT, and .WAV formats
- Man-Machine Interface
  - PID faceplates
  - Animated controls for switches, knobs, and indicator lamps
  - Audio and visual alarms
  - Cycle through, pie area, pushbutton, horizontal, and vertical hit testing on buttons
- Graphic and line animation
- Dynamic bar graphs, needle meters, and histograms
- Presentation, display, training, and block labels modes
- Bitmap library

\* Available in plot block only.

## Block Set

### ANIMATION

animate  
lineDraw

### ANNOTATION

bezel  
comment  
date  
index  
label  
scalarToVec  
variable  
vecToScalar  
wirePositioner

### ARITHMETIC

1/X  
-X  
\*  
/  
abs  
convert  
gain  
pow  
sign  
summingJunction  
unitConversion

### BOOLEAN

>  
<  
>=  
<=  
==  
!=  
and  
not  
or  
xor

### DDE

DDE  
DDEreceive  
DDEsend

### GENERAL

embed  
expression  
userFunction

### INTEGRATION

integrator  
limitedIntegrator  
resetIntegrator

### NEURAL NET (opt)

### LINEAR SYSTEM

stateSpace  
transferFunction

### MATRIX OPERATIONS

buffer  
dotProduct  
fft  
ifft  
invert  
multiply  
transpose  
vsum

### NONLINEAR

case  
crossDetect  
deadband  
int  
limit  
map  
max  
merge  
min  
quantize  
relay  
sampleHold

### OPTIMIZATION

constraint  
cost  
globalConstraint  
parameterUnknown  
unknown

### RANDOM GENERATOR

gaussian  
uniform  
PRBS

### REAL TIME (opt)

encoder  
frequency  
PWM  
rt-DataIn  
rt-DataOut

### SIGNAL CONSUMER

display  
error  
export  
histogram  
light  
meter  
plot  
stop  
stripChart

### SIGNAL PRODUCER

button  
const  
import  
parabola  
pulseTrain  
ramp  
realTime  
sinusoid  
slider  
step

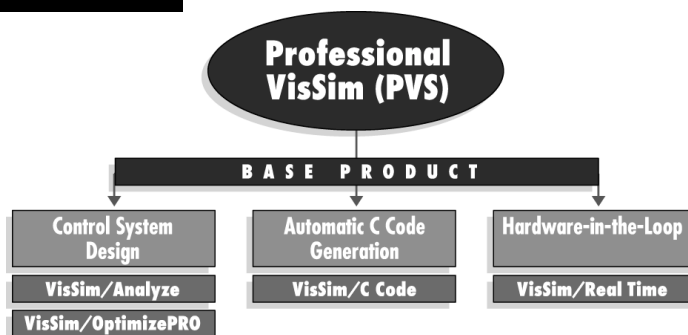
### TIME DELAY

timeDelay  
unitDelay

### TRANSCENDENTAL

acos  
asin  
atan2  
bessel  
cos  
cosh  
exp  
ln  
log10  
sin  
sinh  
sqrt  
tan  
tanh

## VisSim Product Line



## Bundled Solutions

- **VisSim/DSP:** Rapid prototyping of controller to DSP or embedded system
- **VisSim/Comm:** Modeling and simulation of analog and digital communication systems

## Other Options

- VisSim/Neural-Net
- VisSim/fuzzyTECH

## Micro-VisSim

Micro-VisSim is an entry level product offering all of the functionality of Professional VisSim except:

- No userFunction block
- Limited to 100 blocks for model development
- No VisSim Viewer

Micro-VisSim also includes a seven-state version of VisSim/Analyze.

## Technical Specifications

Maximum blocks	500 MB*
Maximum plots	500 MB*
Maximum integrators	500 MB*
Maximum data points per plot	200 MB
Block nesting	500 MB*
Integration methods	7
Numeric precision	IEEE 64-bit
Data file format	ASCII, .M, .MAT, and .WAV
ABCD state-space format	.MAT and .M

\* Limited only by memory.

## System Requirements

- 32-bit Windows (Win 3.1+/Win 32s, Win 95+, or Win NT 4+)
- 4 MB RAM
- 2 MB disk space
- 3½" floppy drive

## VisSim Viewer

Professional VisSim includes VisSim Viewer, a run-time, view-only version of VisSim. The Viewer enables users to distribute VisSim models to individuals not licensed to use VisSim. Recipients of the Viewer can run simulations, change block and simulation parameters, optimize gains, and perform interactive "what if" scenarios.

Windows® 3.1.95,NT  
Compatible



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