Control System Design Software

VisSim/Analyze™

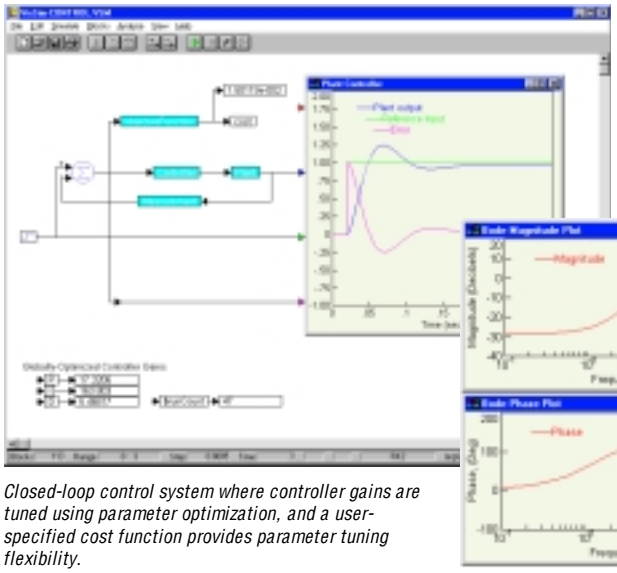
VERSION 3.0

VisSim/Analyze performs frequency domain analysis of a VisSim model or subsystem and helps answer the question "Is this a stable system?"

To approximate the dynamics of a nonlinear system, VisSim/Analyze linearizes the system about a specified operating point. Linearized systems can be represented in ABCD state-space or transfer function form. With VisSim/Analyze, it is easy to access transfer function information, edit zeros and poles, and compute Nyquist, Bode, and root locus plots.

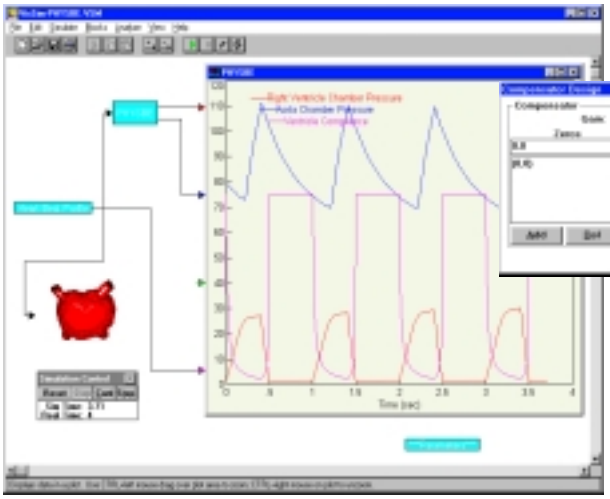
Designing a controller for a plant model is performed interactively by editing compensator zeros and poles, and observing their combined behavior in Bode and root locus plots. Once the desired responses are obtained, the pole placement controller block is simply inserted into a VisSim diagram.

The preliminary placement controller is connected to a plant model creating a feedforward or feedback control loop. A simulation is run in VisSim and the results of the simulation are easily viewed in the form of plots. The stability of the closed-loop system can then be determined using Nyquist plots.



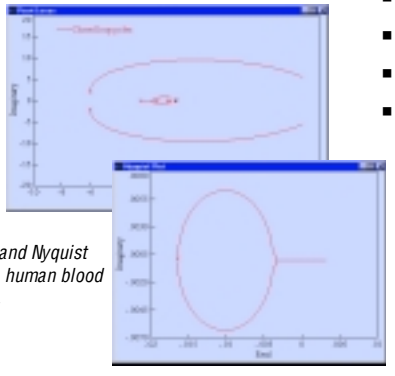
Closed-loop control system where controller gains are tuned using parameter optimization, and a user-specified cost function provides parameter tuning flexibility.

Open-loop Bode magnitude and phase plots of the Controller and plant subsystem.



Simulation and animation of blood flow through a human body.

Interactive compensator design wizard.



Root locus and Nyquist plots of the human blood flow model.

Highlights

- ABCD state-space matrix form
  - — Screen display
  - — .M or .MAT file exportation
  - — Numerical perturbation for creating SISO ABCD state-space linearization
- Transfer function form
  - — Numerator and denominator polynomials in powers of the *s*-plane
  - — Gain, zeros, and poles locator
  - — Clean numerical round-off errors generated during factoring
- Bode phase and magnitude versus log frequency computation
  - — Frequency range and resolution specification
  - — Frequency units specification
  - — Data point coordinates display
- Root locus computation
  - — Gain range and resolution specification
  - — Root locus gain, damping ratio, natural frequency, and real and imaginary coordinates based on a user-selectable *s*-plane point computation
- Nyquist computation
  - — Relative and absolute stability of closed-loop systems
- Compensator design
  - — Interactive design of feedback control systems
  - — Edit poles and zeros
  - — Computation of Bode and root locus plots

Technical Specifications

Linearization	Numerical perturbation with central differencing method
Eigenvalue finder	QR algorithm
Matrix inverter	Singular Value Decomposition
Numeric precision	IEEE 64-bit
ABCD state-space format	.MAT and .M file
Maximum state count for analysis	Up to 10K states

System Requirements

- Professional VisSim 3.0
- 1 MB RAM
- 1 MB disk space
- 3½" floppy drive

Windows® 3.1,95,NT Compatible

Visual Solutions INCORPORATED
487 Groton Road, Westford, MA 01886
Tel: 978-392-0100
1-800-VISSIM-1
Fax: 978-692-3102
Email: sales@vissol.com
Web site: www.vissim.com