


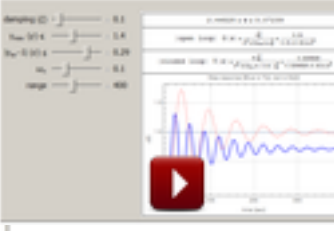
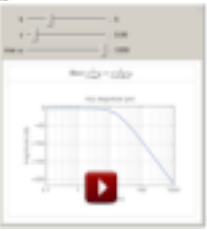
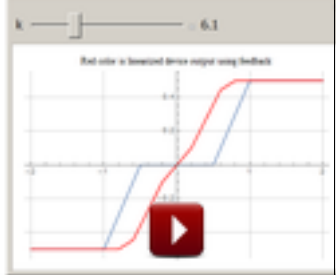
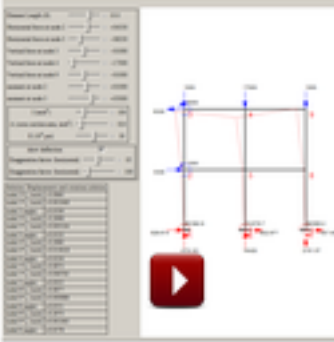

Mathematica Scientific Demonstrations




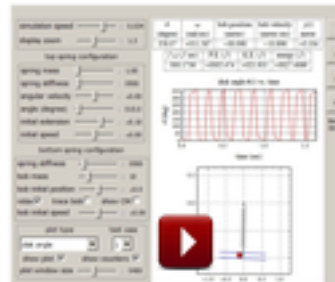
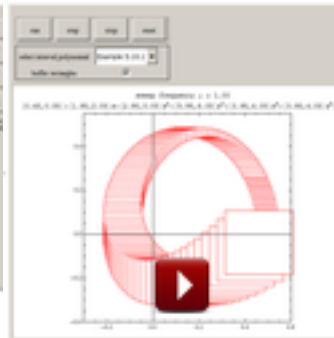
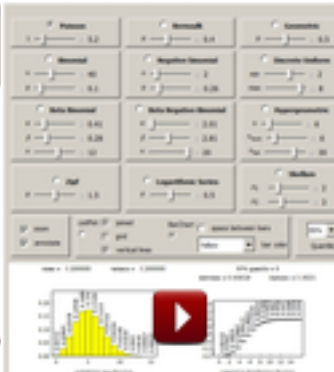
by Nasser M. Abbasi. Updated October 22, 2015

page compiled on Sunday 21st May, 2017 at

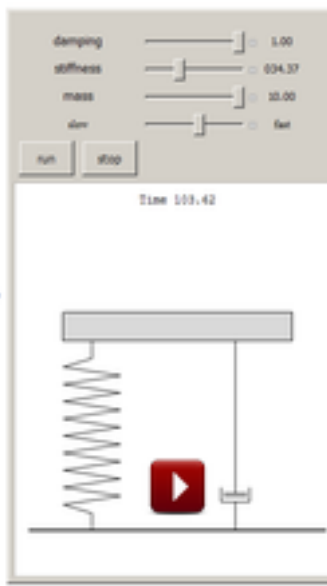
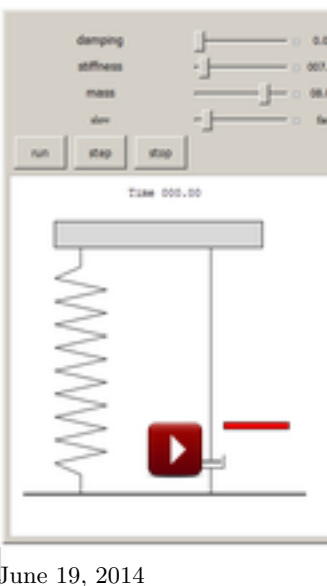
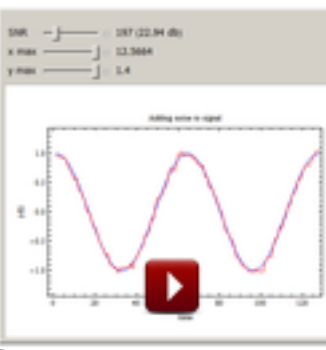
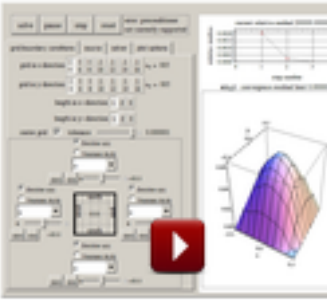
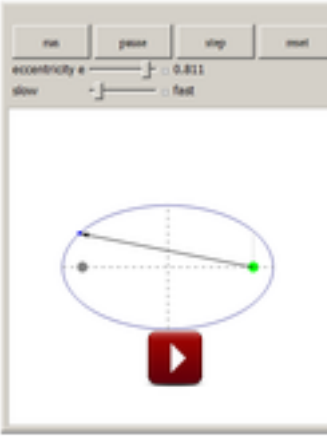

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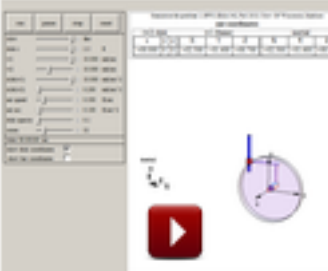
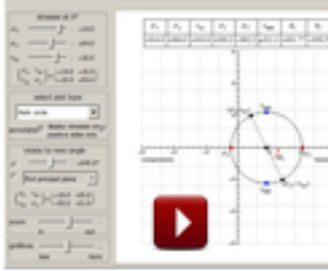

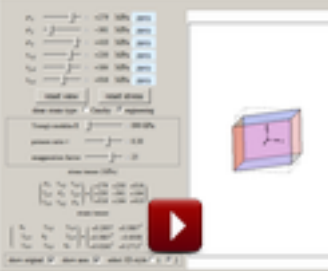
These are Mathematica interactive demonstrations (CDF) I wrote over the last few years. Clicking on the image plays a small movie to illustrate the CDF. Clicking on the link opens a web page that have the CDF file and source code. To play the CDF, download the CDF file to your computer and double click on it to run it using the free Wolfram CDF player

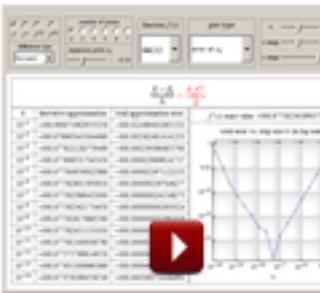
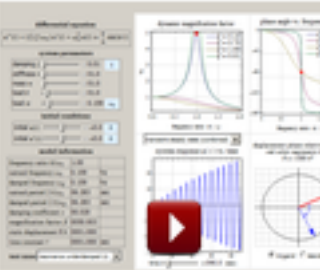

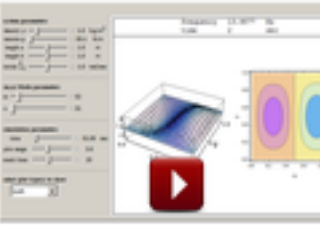


<p>(67) Bouncing ball off the ground with different coefficient of restitution</p>  <p>Nov. 1, 2015 more... (bouncing_ball/)</p>	<p>(66) Design for k using the overshoot design method</p>  <p>Oct. 22, 2015 more... (overshoot_design/)</p>	<p>(65) Plot of magnitude of low pass filter $H(s) = \frac{1}{(1+\epsilon s)^k}$</p>  <p>Oct. 13, 2015 more... (simple_low_pass/)</p>
<p>(64) Linearize a plant using feedback</p>  <p>Sept 28, 2015 more... (linearize_via_feedback/)</p>	<p>(63) Rigid frame using direct stiffness method v.2</p>  <p>June 18, 2015 more... (rigid_frame_2/)</p>	<p>(62) Rigid frame using direct stiffness method v.1</p>  <p>June 16, 2015 more... (simple_rigid_frame/)</p>

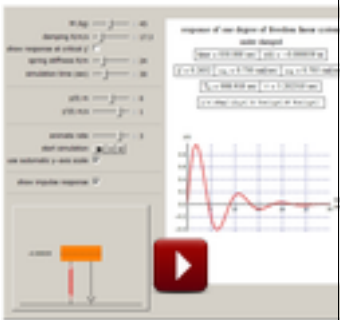
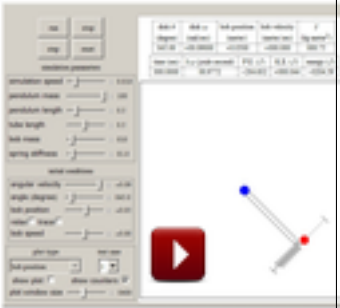
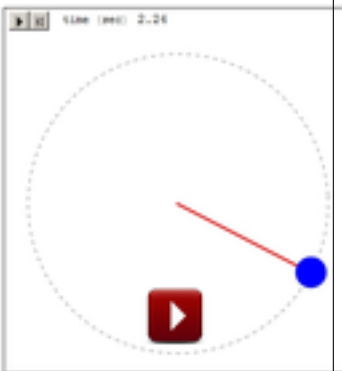

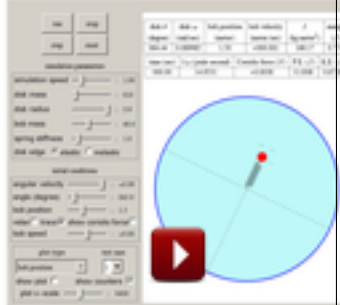

<p>(61) Body of revolution with zero external moment in body coordinates</p>  <p>June 11, 2015 more... (spin_cylinder/)</p>	<p>(60) Equation of motion RRR robot arm</p>  <p>April 1, 2015 more... (robot_arm_RRR/)</p>	<p>(59) Simple example of rotating 3D graphics</p>  <p>April 8, 2015 more... (rotate_example/)</p>
<p>(58) Double pendulum using heavy spring</p>  <p>January 18, 2015 more... (spring_pendulum_type_1/)</p>	<p>(57) Kharitonov rectangle for interval polynomial</p>  <p>Nov 28, 2014 more... (kharitonov_rectangle/)</p>	<p>(56) Illustrating discrete distributions in Version 8</p>  <p>Oct 18, 2014 more... (Discrete_Distributions/)</p>

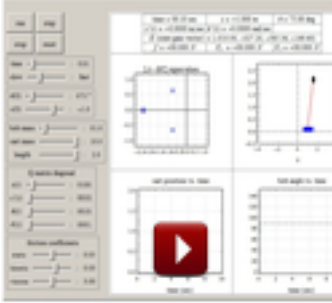
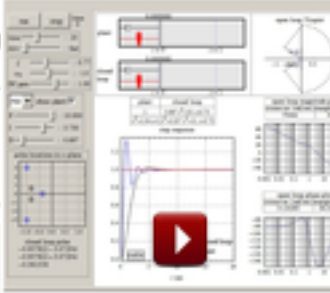
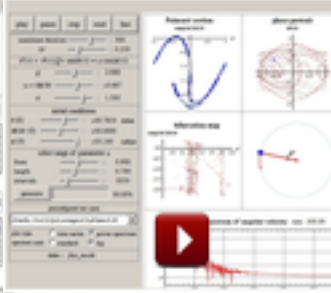
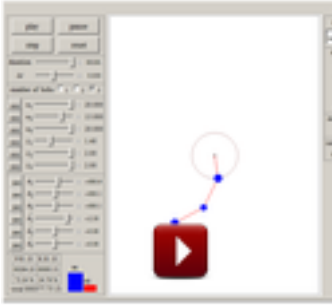

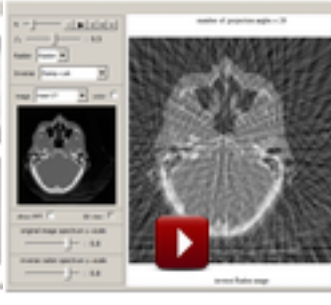
<p>(55) Basic use of Radon/Inverse Radon transforms</p>  <p>Sept 22, 2014 more... (simple_radon/)</p>	<p>(54) Symmetric top gyroscope motion</p>  <p>July 15, 2014 more... (gyroscope_2/)</p>	<p>(53) Solving wave equation using leapfrog method</p>  <p>July 5, 2014 more... (simple_wave_equation/)</p>
<p>(52) Precession effect due to wheel spinning</p>  <p>June 29, 2014 more... (gyroscope_1/)</p>	<p>(51) Rotation Stability of spinning cube</p>  <p>June 28, 2014 more... (spin_cube/)</p>	<p>(50) spinning wheel in 3D</p>  <p>June 29, 2014 more... (spinning_wheel/)</p>



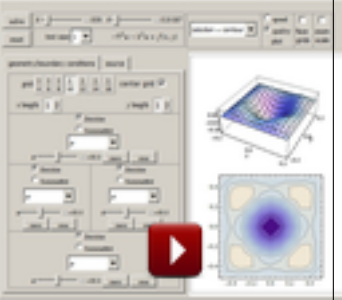
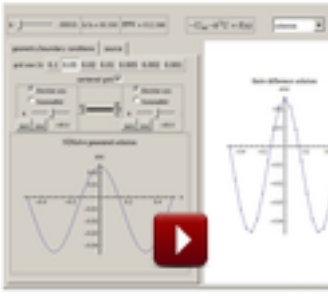
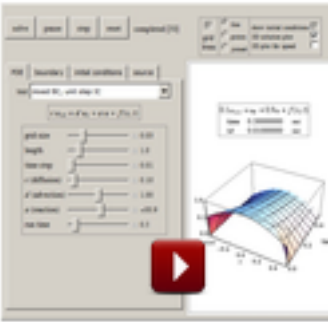
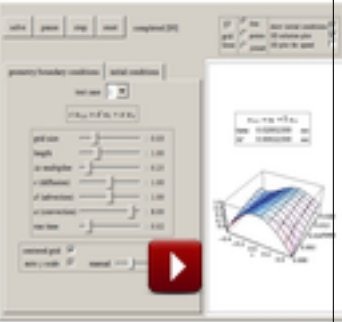
<p>(49) simple spring-mass-damper</p>  <p>June 19, 2014 more... (simple_spring_mass_damper/)</p>	<p>(48) simple spring-mass-damper with stop bar</p>  <p>June 19, 2014 more... (simple_spring_mass_damper_2/)</p>	<p>(47) Adding Gaussian noise to signal using SNR ratio</p>  <p>June 21 2014 more... (random_noise/)</p>
<p>(46) Solving 2D Poisson PDE on non-uniform rectangle grid</p>  <p>May 30, 2014 more... (poisson_2D/)</p>	<p>(45) Elliptical satellite motion demo</p>  <p>January 24, 2014 more... (ellipse/)</p>	<p>(44) Velocity and acceleration for circular motion</p>  <p>January 4 2014 more... (rotation_demo/)</p>


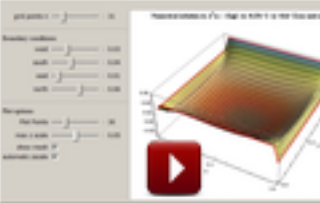
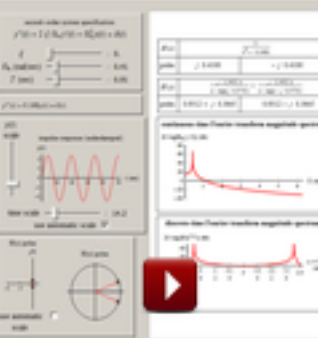
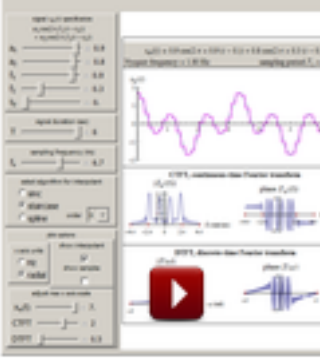
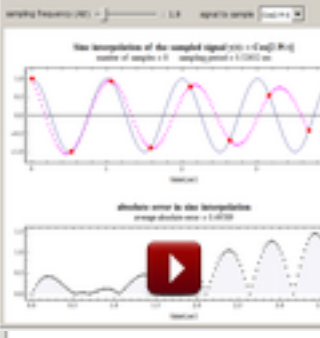
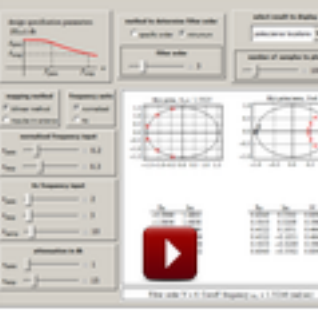
<p>(43) Illustrating discrete distributions in Version 7</p>  <p>December 28, 2013 more... (Discrete_Using_Manipulate/)</p>	<p>(42) EMA 542 Advanced dynamics final project</p>  <p>Dec 19, 2013 more... (EMA542_project/)</p>	<p>(41) EMA 542 HW3 problem 1</p>  <p>Dec 19, 2013 more... (EMA_542_HW3_problem_1/)</p>
<p>(40) Mohr's Circle For Plane Stress</p>  <p>Nov 10, 2013 more... (principle_stresses_in_2D/)</p>	<p>(39) Three pendulums with two springs</p>  <p>August 16, 2013 more... (three_pendulums_with_2_springs/)</p>	<p>(38) Direct and Shear Strain Deformation in 3D</p>  <p>sept 7, 2013 more... (strain_in_plain_stress/)</p>

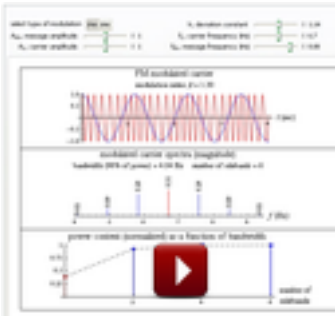
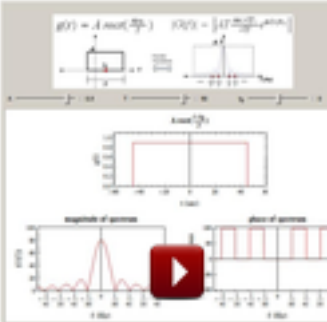
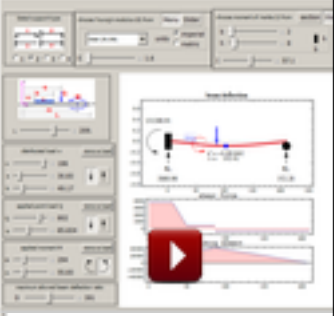
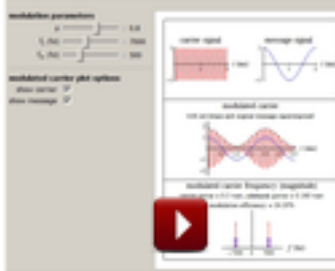
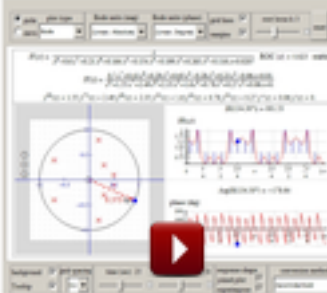
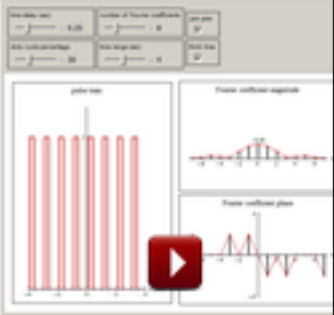
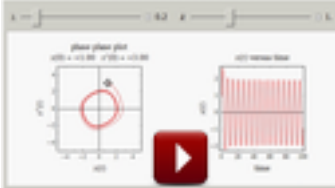
<p>(37) Finite Difference Formulas Generated By Interpolating Polynomial</p>  <p>August 29, 2013 more... (finite_difference/)</p>	<p>(36) Vibration analysis of single degree freedom system</p>  <p>August 29, 2013 more... (single_degree_responses/)</p>	<p>(35) ImageData Using Rows And Columns</p>  <p>August 7, 2013 more... (image/)</p>
<p>(34) 2D membrane mode vibration</p>  <p>July 31, 2013 more... (membrane_2D/simulation/)</p>	<p>(33) 2 cylinders with 3 springs</p>  <p>July 26, 2013 more... (two_cylinders_with_3_springs/)</p>	<p>(32) Generalized Single Degree Of Freedom for wind tower structure</p>  <p>July 28, 2013 more... (tower/)</p>

<p>(31)Vibration analysis of free response of second order system</p>  <p>July 24 2013 more... (unforced_response/)</p>	<p>(30)Mass on a spring at end of a solid pendulum</p>  <p>Nov 11, 2012 more... (solid_pendulum_with_spring_mass/)</p>	<p>(29)Direct dynamics for simulation of pendulum</p>  <p>Nov 10, 2012 more... (simple_pendulum_direct/)</p>
<p>(28)Posteriori (discrete) particle collision</p>  <p>Sept 25, 2012 more... (particle_simulation/)</p>	<p>(27)Oscillating Mass On Rotating Table</p>  <p>August 8, 2012 more... (slot_on_disk/)</p>	<p>(26)Finite element using Ritz method for axial loaded beam</p>  <p>June 2, 2012 more... (uniaxial_beam_ritz/)</p>

<p>(25)LQR Control of inverted pendulum on moving cart with friction</p>  <p>April 16, 2012 more... (inverted_pendulum/)</p>	<p>(24)PID controller design for second order system</p>  <p>Feb 2, 2012 more... (PID/)</p>	<p>(23)Chaotic motion of damped driven pendulum</p>  <p>September 2, 2011 more... (simple_pendulum_damped_driven/)</p>
<p>(22)Triple pendulum with damping</p>  <p>September 1, 2011 more... (double_pendulum/)</p>	<p>(21)Computed tomography using Radon Transform (v.1)</p>  <p>July 5, 2011 more... (CT_sweep/)</p>	<p>(20)Computed tomography using Radon Transform (v.2)</p>  <p>July 4, 2011 more... (CT/)</p>

<p>(19) Rigid body disk pendulum rotating on moving table</p>  <p>June 25, 2011 more... (pendulum_on_moving_table/)</p>	<p>(18) Rigid body pendulum on a flywheel</p>  <p>June 8, 2011 more... (pendulum_flywheel/)</p>	<p>(17) Finite difference for solving Helmholtz differential equation in 2D</p>  <p>Feb 2, 2012 more... (Helmholtz_2D/)</p>
<p>(16) Finite difference for solving Helmholtz differential equation in 1D</p>  <p>March 6, 2012 more... (Helmholtz_1D/)</p>	<p>(15) Finite difference solution for diffusion-advection-reaction (heat) in 1D</p>  <p>Feb 20, 2012 more... (diffusion_advection_reaction_1D/)</p>	<p>(14) Finite difference solution of the diffusion-convection in 1D</p>  <p>Feb 10, 2012 more... (diffusion_convection_1D/)</p>

<p>(13) Minimal example to solve Poisson 2D using Jacobi method</p> 	<p>(12) Finite difference for solving poisson PDE on unit squared</p>  <p>Nov 14, 2010 more... (poisson2DSolver/)</p>	<p>(11) Analog-to-discrete system conversion using impulse invariance</p>  <p>May 3, 2010 more... (filter/)</p>
<p>March 6, 2012 more... (jacobi_2d/)</p>		
<p>(10) Continuous Time Fourier Transform to Discrete Time by Sampling</p>  <p>April 7 2010 more... (DTFT_demo/)</p>	<p>(9) Sinc interpolation</p>  <p>Feb 18 2010 more... (sinc_interpolat/)</p>	<p>(8) IIR digital low-pass Filter Design by Butterworth method</p>  <p>Sept 25, 2010 more... (IIR_design/)</p>

<p>(7) Power content of frequency modulation and phase modulation</p>  <p>September 6 2009 more... (FM_simulation/)</p>	<p>(6) Rectangular pulse and its Fourier transform</p>  <p>December 27 2009 more... (sinc_rect/)</p>	<p>(5) Single span Euler Bernoulli beam</p>  <p>Oct 21 2009 more... (euler_beam_demo/)</p>
<p>(4) Power efficiency of amplitude modulation</p>  <p>August 31 2009 more... (AM_simulation/)</p>	<p>(3) Design a digital filter using locations of poles and zeros</p>  <p>April 13 2009 more... (pole_zero/)</p>	<p>(2) Fourier series coefficients of a rectangular pulse signal</p>  <p>April 12 2009 more... (rect_train/)</p>
<p>(1) Van der Pol differential equation</p>  <p>April 11 2009 more... (vanderpol/)</p>		