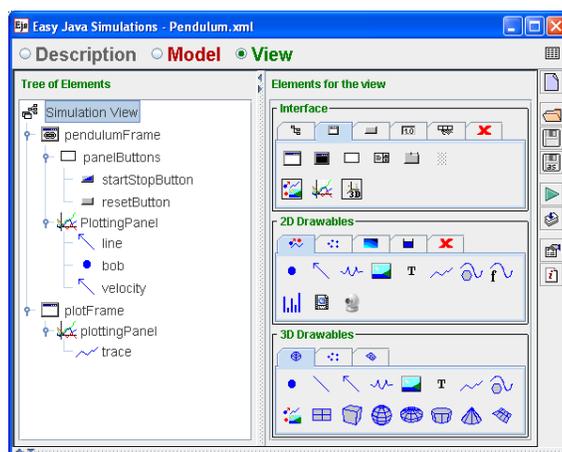# Workshop on Easy Java Simulations

Date: September 24th, 2009 – MPTL 14 Udine
Leaders: Francisco Esquembre, Wolfgang Christian, and Bruce Mason
Location: LDI computer Lab

The premise of Easy Java Simulations (EJS) modeling is that when students are not actively involved in modeling they lose out on much of what can be learned from computer simulations. Although the modeling method can be used without computers, the use of computers allows students to study problems that are difficult and time consuming, to visualize their results, and to communicate their results with others. EJS is a free open-source Java application that simplifies the modeling process by breaking it into activities: (1) documentation, (2) modeling, and (3) interface design.   The EJS program and examples of models will be available on CD. EJS models, documentation, and sample curricular material can also be downloaded from Open Source Physics collection in the comPADRE NSF Digital Library http://www.compadre.org/osp and from the Easy Java Simulations http://www.um.es/fem/Ejs website.

About Easy Java Simulations

Easy Java Simulations (EJS) is a modeling and authoring tool that helps science teachers and students create interactive simulations of scientific phenomena. These simulations can then be used in computer laboratories with students to better explain difficult concepts, to motivate them to study science, or to let students work with the simulations or (for more advanced students) even create their own ones. Both activities have proven to be very powerful didactical resources.

EJS has been specifically designed to be used by people with no advanced programming skills. Hence, it tries very hard to make all the technical tasks easy. Authors still need to define the model of the phenomenon studied and design the visualization and interface for the data of the simulation. This means authors need to learn how to program scientific algorithms into Java language. But the extensive help provided by EJS make this far easier than what is traditionally called "learning to program".

The outcome of the work with EJS is a modern simulation, with high graphical and interaction capabilities, and which can be very easily posted on a Web page on the Internet.

Easy Java Simulations is open source software, and is therefore absolutely free of any charge and can be freely distributed to colleagues or students.

About the workshop

This workshop will benefit anyone wishing to use our ready to run computer models for teaching. This workshop will also benefit computer-modeling instructors as well as computational physicists wishing to adopt Open Source Physics tools for their own teaching and research. We will discuss the general pedagogical and technical issues in the design of interactive computer-based tutorials as well as how EJS models can be adapted to your local situation.

Participants will receive a CD containing EJS curricular material as well as material from other Open Source Physics (OSP) projects. All OSP programs are feely distributable under the GNU GPL license. Attending the workshop is free of charge.

The instructors of the seminar are Francisco Esquembre (Universidad de Murcia, Spain). Wolfgang Christian (Davidson College, NC, USA), and Bruce Mason (University of Oklahoma, OK, USA). The workshop expositions will be given in English, though questions can be asked in other languages, too. (Wolfgang speaks German and Austrian; Francisco speaks Spanish, some French and also welcomes Italian speakers who speak slowly! ☺)

Organization of the workshop

The workshop will start with a 30 minute introduction and overview of EJS. The group will then split into three different one and a half hour threads designed to address the needs of different participants. Individualized assistance will be provided during the session.

The first thread, "EJS 101", is dedicated to newcomers who want to learn the principles of how EJS works. Participants who follow this thread will complete a hands-on tutorial on the software in which they will study, step by step, a simple example that they will first explore to learn how it has been done, and then modify to add new capabilities. This thread is recommended for participants without programming experience.

The second thread, "Teaching Computation and Modeling with EJS", is designed for users of EJS who want to learn new EJS features and how they can be used to implement simple computational physics models. This thread is recommended for users with some programming experience.

The third thread, "Using EJS-based curricular materials", is designed to help instructors employ EJS materials in their classes. This thread will focus on the connection between EJS and the comPADRE digital library, ways to download, adapt, and share physics-related curricular material based on EJS simulations, and using personal collections to organize resources. This thread is recommended for teachers who are more interested in preparing or using EJS-based curricular material than in programming new simulations.