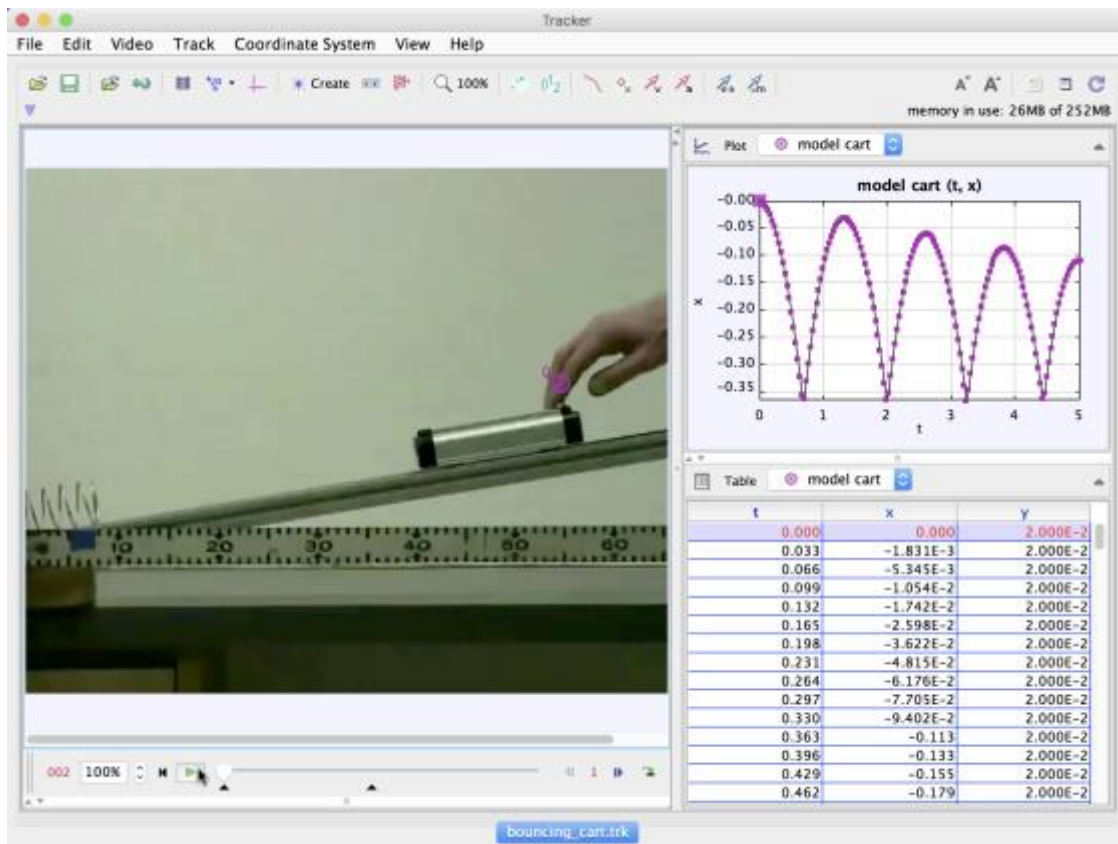


Open Source Physics Workshop

Tracker & Easy JavaScript Simulations



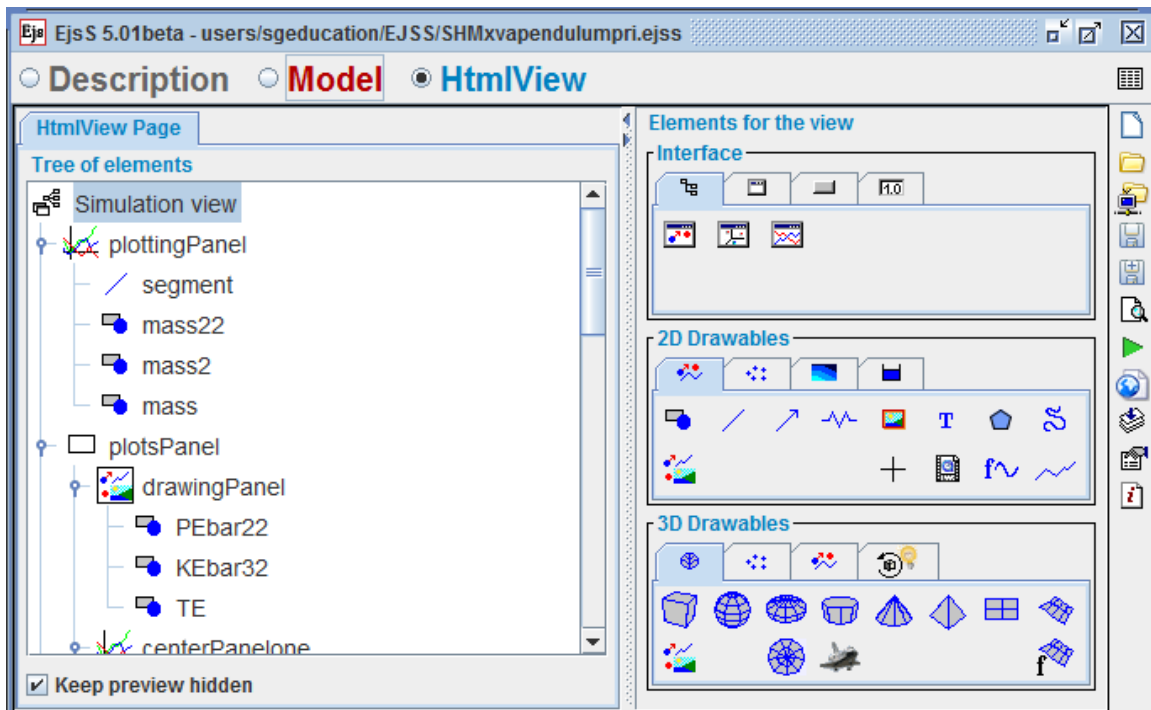
This workshop aims to provide a hands-on experience to the AAPT-ComPADRE Open Source Physics (OSP) project, Tracker video analysis, and the Easy Java/JavaScript Simulations (EJS) modelling and authoring tool. This one-day workshop combines a morning Tracker tutorial where participants explore Tracker video experiments followed by an afternoon tutorial where users explore existing ready-to-run JavaScript simulations and the EJS modelling tool. EJS is a code generator that uses the OSP code library to add and build interactive user interfaces, draw 2D and 3D objects, numerically solve ordinary differential equations using different algorithms, and represents data using tables and graphs.

The goal of the Open Source Physics (OSP) project is to make computational tools, a large number of simulations together with source code, and supporting curricular material available for education using a Creative Commons open-source license for distribution.

Participants will study and explore, step by step, Tracker and EJS examples available on ComPADRE and other digital libraries.

Although there are many computational tools that allow scientists and teachers to create simulations, the implementation of a computational modelling-based pedagogy often requires significant effort and computer science knowledge for teachers and students. The EJS modelling and authoring tools minimize this effort. EJS is a free open-source code generator developed to create dynamic simulations using the underlying Java library. EJS was originally created for interactive learning under the supervision of educators but it is well suited for use by researchers to prototype applications and by authors to develop and distribute Java-based and more recently JavaScript-based curricular materials. While some programming knowledge is assumed, EJS users are encouraged to focus on modelling rather than on programming. EJS JavaScript models can be distributed as html web pages, EPUB 3 books, and Android or iOS apps.

This workshop will benefit teachers who as wish to adopt and adapt Tracker and EJS material from digital libraries, such as AAPT ComPADRE, for their own teaching. During the workshop, we will discuss the general pedagogical and technical issues in the design of interactive computer-based tutorials as well as how use models and worksheets from the Open Source Physics (OSP) Collection on the AAPT-ComPADRE National Science Digital Library <http://www.compadre.org/OSP/>.



Participants are encouraged to bring their personal laptops to this workshop. It will save time if everyone already has a recent version of Java 7 installed. For one-click download go to: <https://java.com/en/>. More extensive instructions go to: https://www.java.com/en/download/help/download_options.xml

Schedule

- 9:15: Introductions and Overview (Yerushalmi)
Assemble in lecture hall.
- 9:30: Introduction to OSP and Tracker (Christian)
- 10:15: Break
- 10:30: Tracker Exercises
Participants move to classrooms and work in pairs analyzing videos.
 - Group 1: Yerushalmi and Erdi
 - Group 2: Christian and Pundak
- 11:45: Tracker Discussion
Assemble in lecture hall. Participants describe their experience followed by a short demonstration for how to organize and distribute Tracker experiments in a Tracker Digital Library for classroom use.
- 12:15: Lunch
- 12:45: Introduction to EJS (Christian and Pundak)
How to install and run EJS. Explanation of how EJS simulations are organized. Step-by-step presentation for how to access an existing JavaScript simulation and adapt it for Israeli students.
- 13:45: Break
- 14:00: EJS Exercises
Participants move to classrooms and work in pairs creating or adapting EJS Simulations.
 - Group 1: Using and adapting existing simulations. (Pundak and Yerushalmi)
 - Group 2: Modifying simulations and creating new simulations. (Christian and Erdi)
- 15:45: EJS Discussion (Christian)
Assemble in lecture hall. Participants describe their experience followed by a short demonstration for how to distribute and package multiple simulations for classroom use.
- 16:10: Workshop Wrap-up (Yerushalmi)
- 16:15: Workshop End