JSim

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梗概

- 软件产生背景
- 软件下载地址及安装方法
- 用法演示

什么是生理组学…

- The term comes from "physio-" (life) and "-ome" (as a whole). In its broadest sense, the physiome should define relationships from genome to organism and from functional behavior to gene regulation

什么是Jsim…

- JSim is a Java-based simulation system for building quantitative numeric models and analyzing them with respect to experimental reference data.
- JSim models may intermix ODEs, PDEs, implicit equations, integrals, summations, discrete events and procedural code as appropriate.

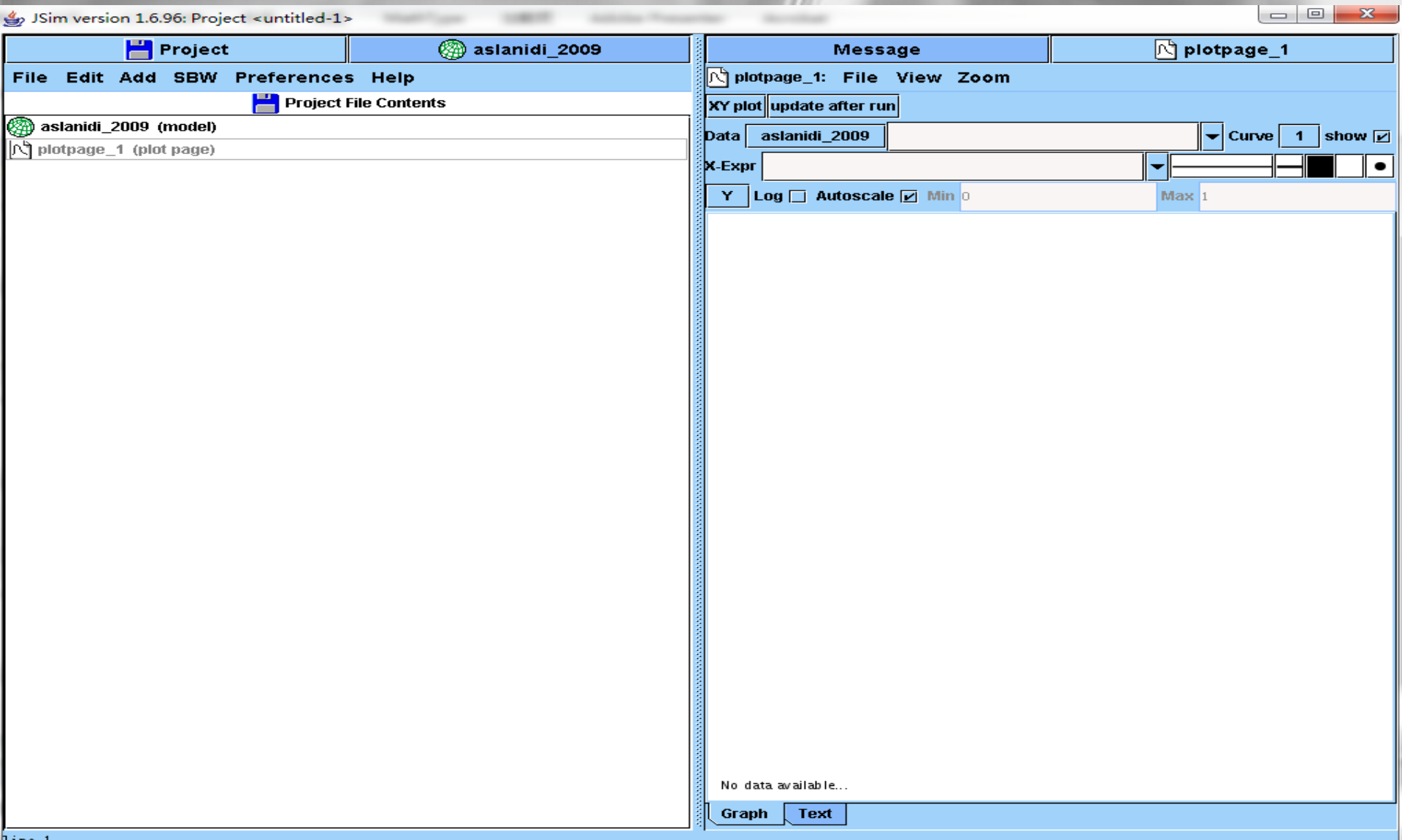
网站的相关介绍

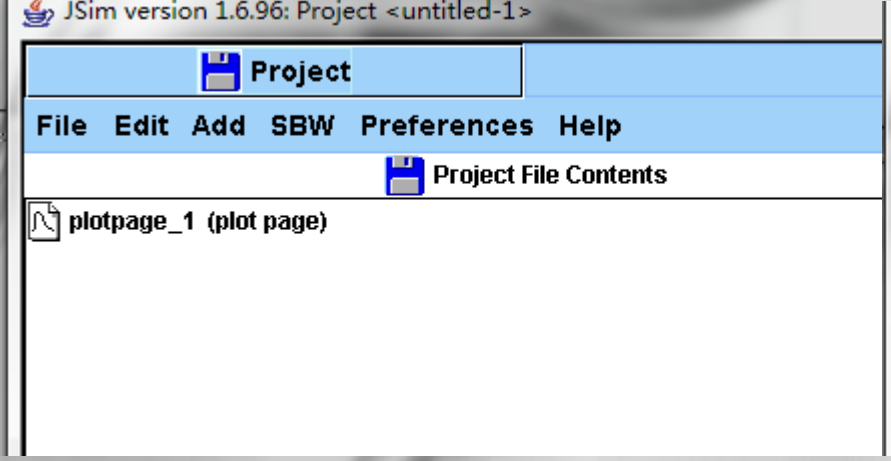
- http://nsr.bioeng.washington.edu/jsim/
- What's new?
- Download and installation
- Running Jsim
- Writing Jsim models
- Model archives
- Instructional videos
- Glossary
- Internats Development
- Bibilography
- Acknowledgements

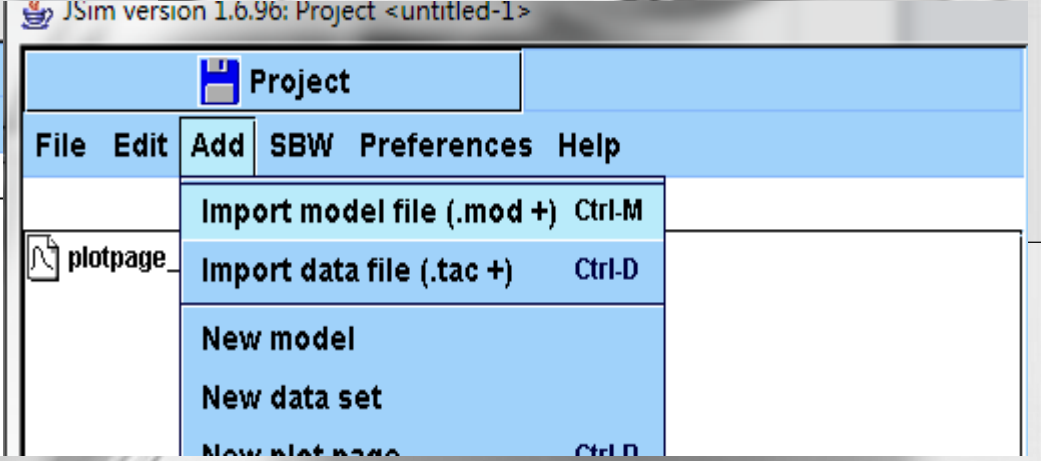
软件下载与安装

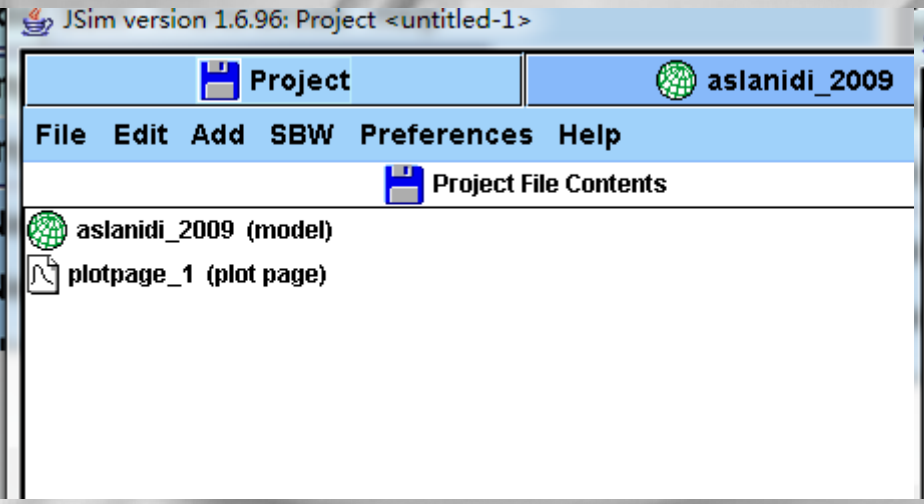
- JSIM 最新版本为1.6.98
- JSIM 支持windows，linux，MacOS等操作系统，并提供2进制文件下载
- JSIM的运行需要Java Runtime Environment (JRE) 支持
- 解压→JSim_win32→win32→bin→双击运行jsim.bat

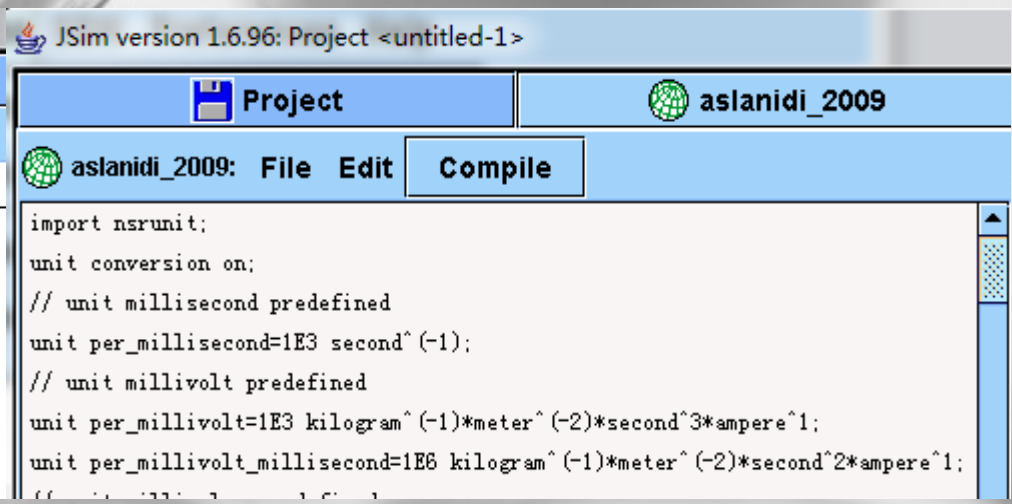
启动界面

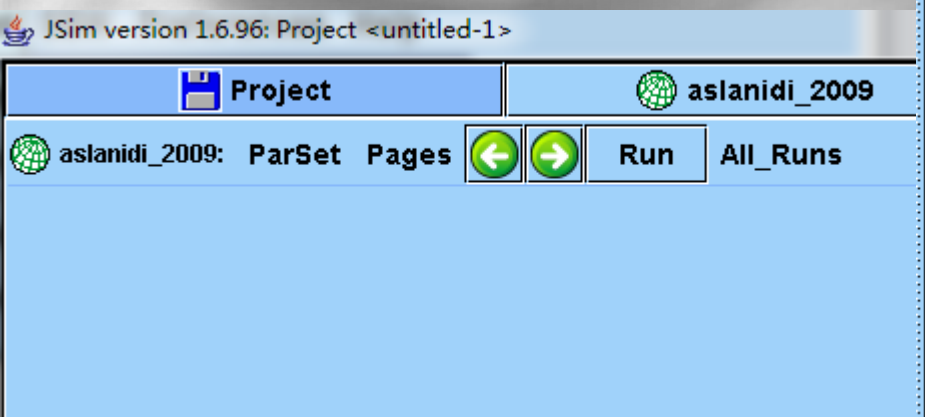

JSim version 1.6.96: Project <untitled-1>
Project
aslanidi_2009
File Edit Add SBW Preferences Help
Project File Contents
aslanidi_2009 (model)
plotpage_1 (plot page)
Message
plotpage_1
plotpage_1: File View Zoom
XY plot
update after run
Data
aslanidi_2009
Curve
1
show
X-Expr
Y
Log
Autoscale
Min
0
Max
1
No data available...
Graph
Text

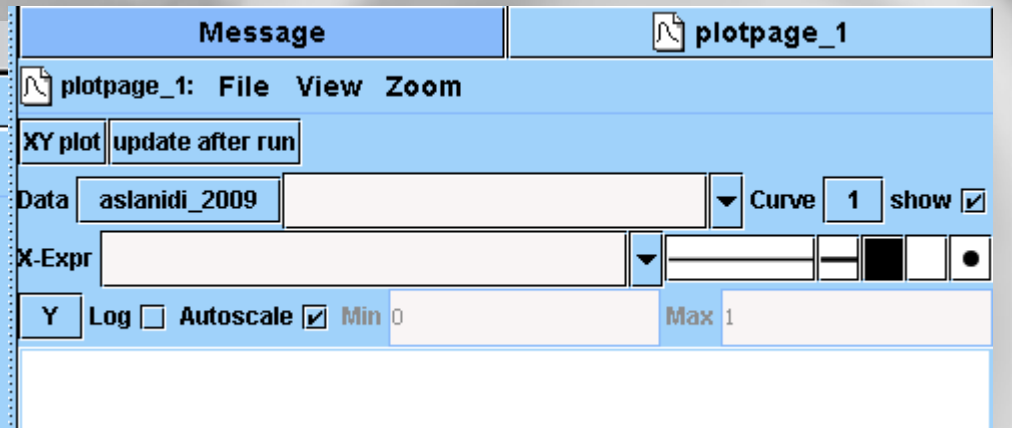

JSim version 1.6.96: Project <untitled-1>
Project
File Edit Add SBW Preferences Help
Project File Contents
plotpage_1 (plot page)


JSim version 1.6.96: Project <untitled-1>
Project
File Edit Add SBW Preferences Help
Import model file (.mod +) Ctrl-M
Import data file (.tac +) Ctrl-D
New model
New data set


JSim version 1.6.96: Project <untitled-1>
Project
aslanidi_2009
File Edit Add SBW Preferences Help
Project File Contents
aslanidi_2009 (model)
plotpage_1 (plot page)


JSim version 1.6.96: Project <untitled-1>
Project
aslanidi_2009
aslanidi_2009: File Edit Compile
import nsrunit;
unit conversion on;
// unit millisecond predefined
unit per_millisecond=1E3 second^(-1);
// unit millivolt predefined
unit per_millivolt=1E3 kilogram^(-1)*meter^(-2)*second^3*ampere^1;
unit per_millivolt_millisecond=1E6 kilogram^(-1)*meter^(-2)*second^2*ampere^1;


JSim version 1.6.96: Project <untitled-1>
Project
aslanidi_2009
aslanidi_2009: ParSet Pages Run All_Runs


Message
plotpage_1
plotpage_1: File View Zoom
XY plot
update after run
Data
aslanidi_2009
Curve
1
show
X-Expr
Y
Log
Autoscale
Min
0
Max
1

WRITING JSIM MODELS

- JSim models are written in JSim‘s own Mathematical Modeling Language(MML), an easy-to-read text-based language.
- MML models are most often expressed in terms of mathematical equations (for example, ordinary or partial differential equations), but formulation via discrete events and function calls to Java, C and Fortran are also available.
- MML is constructed so that model writers may intermix mathematics, events and procedural code as needed.

aslanidi_2009.mod

```
import nsrunit;
unit conversion on;
// unit millisecond predefined
unit per_millisecond=1E3 second^(-1);
// unit millivolt predefined
unit per_millivolt=1E3 kilogram^(-1)*meter^(-2)*second^3*ampere^1;
unit per_millivolt_millisecond=1E6 kilogram^(-1)*meter^(-2)*second^2*ampere^1;
// unit millimolar predefined
unit millimolar2=1 meter^(-6)*mole^2;
unit millimolar3=1 meter^(-9)*mole^3;
unit millimolar4=1 meter^(-12)*mole^4;
unit millimolar_per_millisecond=1E3 meter^(-3)*second^(-1)*mole^1;
unit millisecond_millimolar=1E-3 meter^(-3)*second^1*mole^1;
unit millisecond_per_millivolt2=1E3 kilogram^(-2)*meter^(-4)*second^7*ampere^2;
unit milliS_per_microF=1E3 second^(-1);
unit microA_per_microF=1 kilogram^1*meter^2*second^(-4)*ampere^(-1);
unit microA_per_microF_2=1 kilogram^2*meter^4*second^(-8)*ampere^(-2);
unit microF=1E-6 kilogram^(-1)*meter^(-2)*second^4*ampere^2;
// unit microlitre predefined
unit cm_per_siemens=.01 kilogram^1*meter^3*second^(-3)*ampere^(-2);
unit cm=.01 meter^1;
unit cm2=1E-4 meter^2;
unit cm_per_second=.01 meter^1*second^(-1);
unit joule_per_kilomole_kelvin=.001 kilogram^1*meter^2*second^(-2)*kelvin^(-1)*mole^(-1);
unit coulomb_per_mole=1 second^1*ampere^1*mole^(-1);
unit microF_per_cm2=.01 kilogram^(-1)*meter^(-4)*second^4*ampere^2;

math main {
  realDomain time millisecond;
  time.min=0;
  extern time.max;
  extern time.delta;
  real V(time) millivolt;
  when(time=time.min) V=-83.43812846286808;
  real i_stim(time) microA_per_microF;
  real i_tot(time) microA_per_microF;
  real i_Na(time) microA_per_microF;
  real i_Na_L(time) microA_per_microF;
```

JSIM MODEL ARCHIVES

- NSR Physiome WebModel Database (250 MML models, and growing)
- Physiome model archive (91 MML models)
- Physiome project model CVS archive
- Biomodels archive (172 SBML models)
- JWS models database (68 SBML models)
- Kegg pathways database (72,000+ SBML models)
- CellML archive (883 CellML models)
- FPack archive (legacy XSIM models) (9 MML models)
- MML examples (90 MML models)
- NSR Modeling Course Materials Archive

软件演示

http://nsr.bioeng.washington.edu/jsim/movies/index.html

Thanks for attention!