Dizzy: a stochastic simulator

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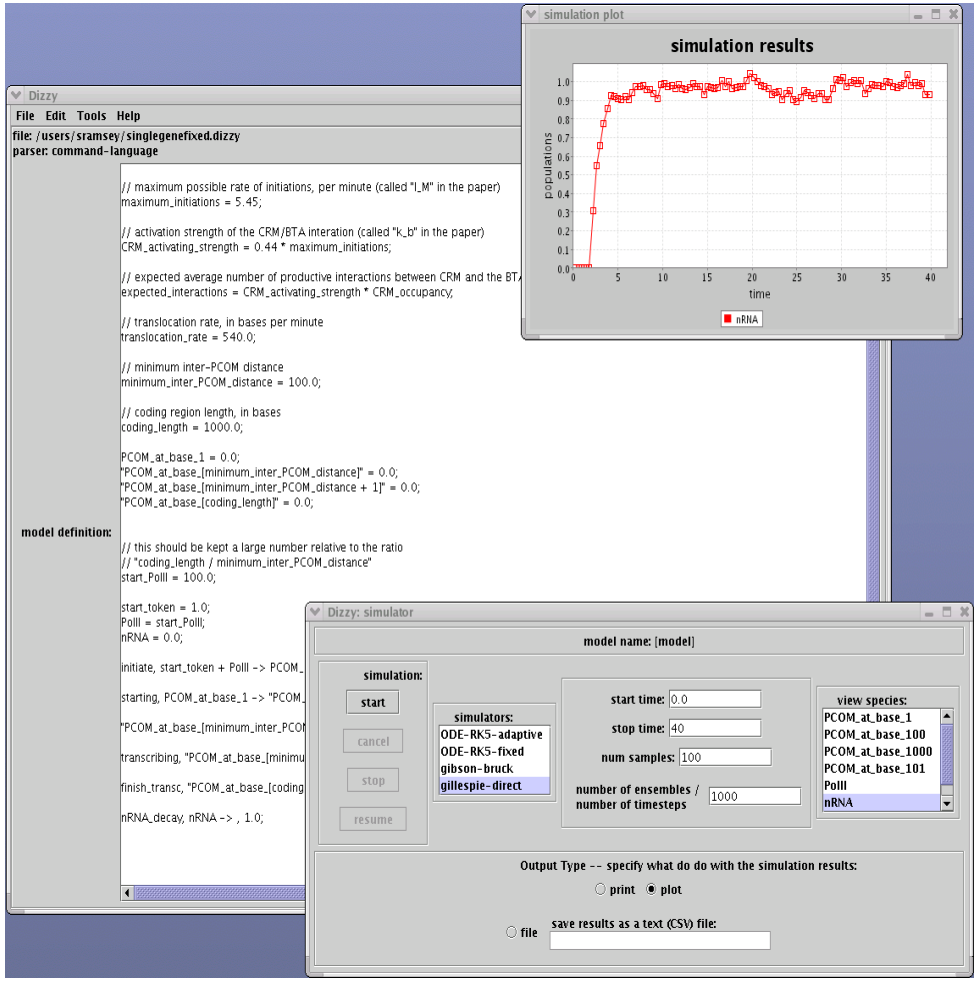
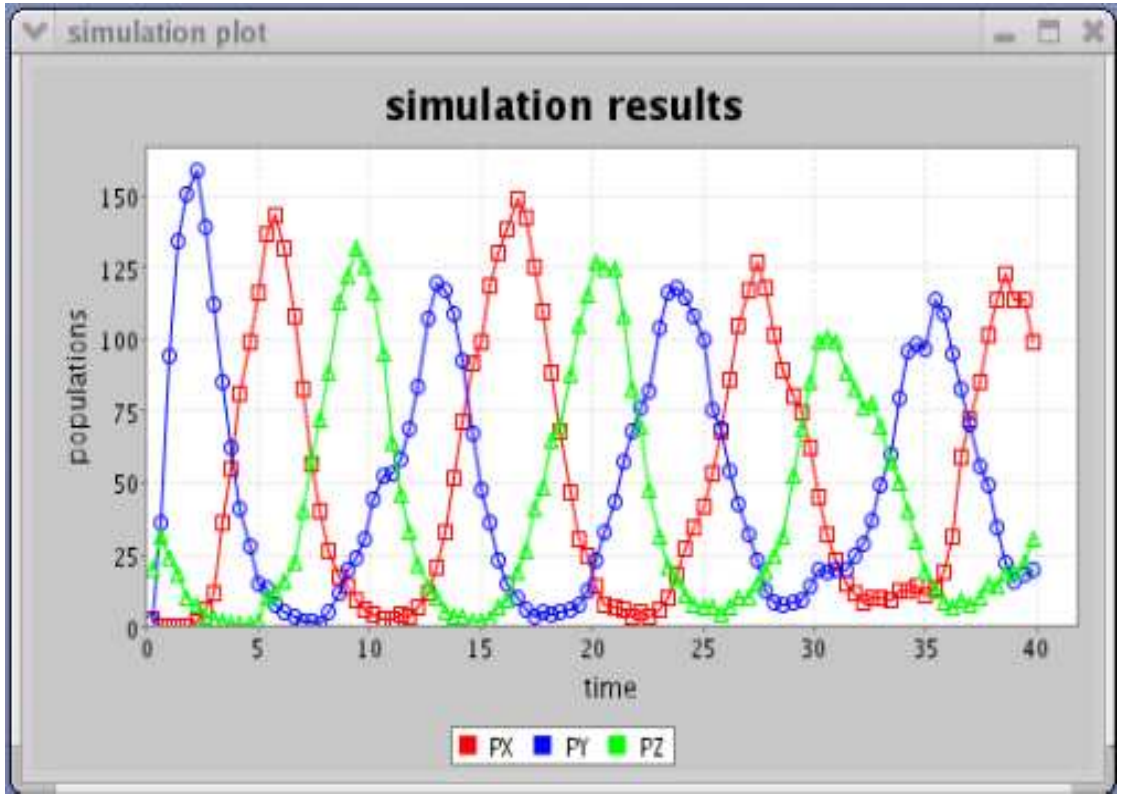
Dizzy Overview

- SBML import/export
- Java with Swing GUI
- Stochastic simulators
- ODE simulators
- “Dizzy” language
- SBW integration
- Cytoscape integration



SBML Import: Repressilator



Stochastic simulation of “Repressilator” model of Elowitz et al. (2000)

Dizzy can import SBML Level 1, versions 1 and 2 (exports L1,V1)

Dizzy Language

- Symbolic mathematical expressions:
```
R = [A*B*(1.0-time)*k]
```
- Define simple chemical reactions:
```
R1, A + B -> C + D, [R]
```
- Loop constructs:
```
loop (i, 1, 10)
{
   "r[i]", "A[i]" + "B[i]"  -> "C[i]", k;
}
```
- File inclusion:
```
#include "foo.dizzy";
```
- Compartments:
```
A @ myCompartment;
```
- Multi-step reactions:
```
transcribe, pcomplex -> pcomplex + rna, rate, 1000;
```
- Comments:
```
// this is a comment
```

Future Work

- Template feature for reusable model elements
- Support for SBML Level 2 import (export?)
- Improve performance of ODE simulators
- Model diffusion and transport
- Interoperate with BioTapestry
- Automatically obtain steady-state

Software Used

- ISBJava: ISB (labs.systemsbiology.net/bolouri)
- Graphing: Jfreechart (www.jfree.org)
- JNLP: NetX (jnlp.sourceforge.net/netx)
- JavaHelp: Sun (java.sun.com/products/javahelp)
- SBW: SBW Dev Grp (www.sbw-sbml.org)
- SBML lib: SBML Dev Grp (www.sbw-sbml.org)
- Ant: Apache Project (ant.apache.org)
- InstallAnywhere: Zero-G (www.zerog.com)

Dizzy on the Web

http://labs.systemsbiology.net/bolouri/software/Dizzy