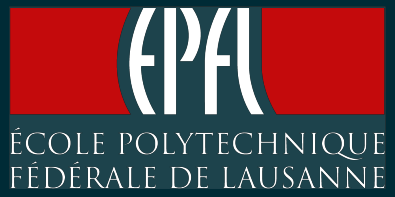
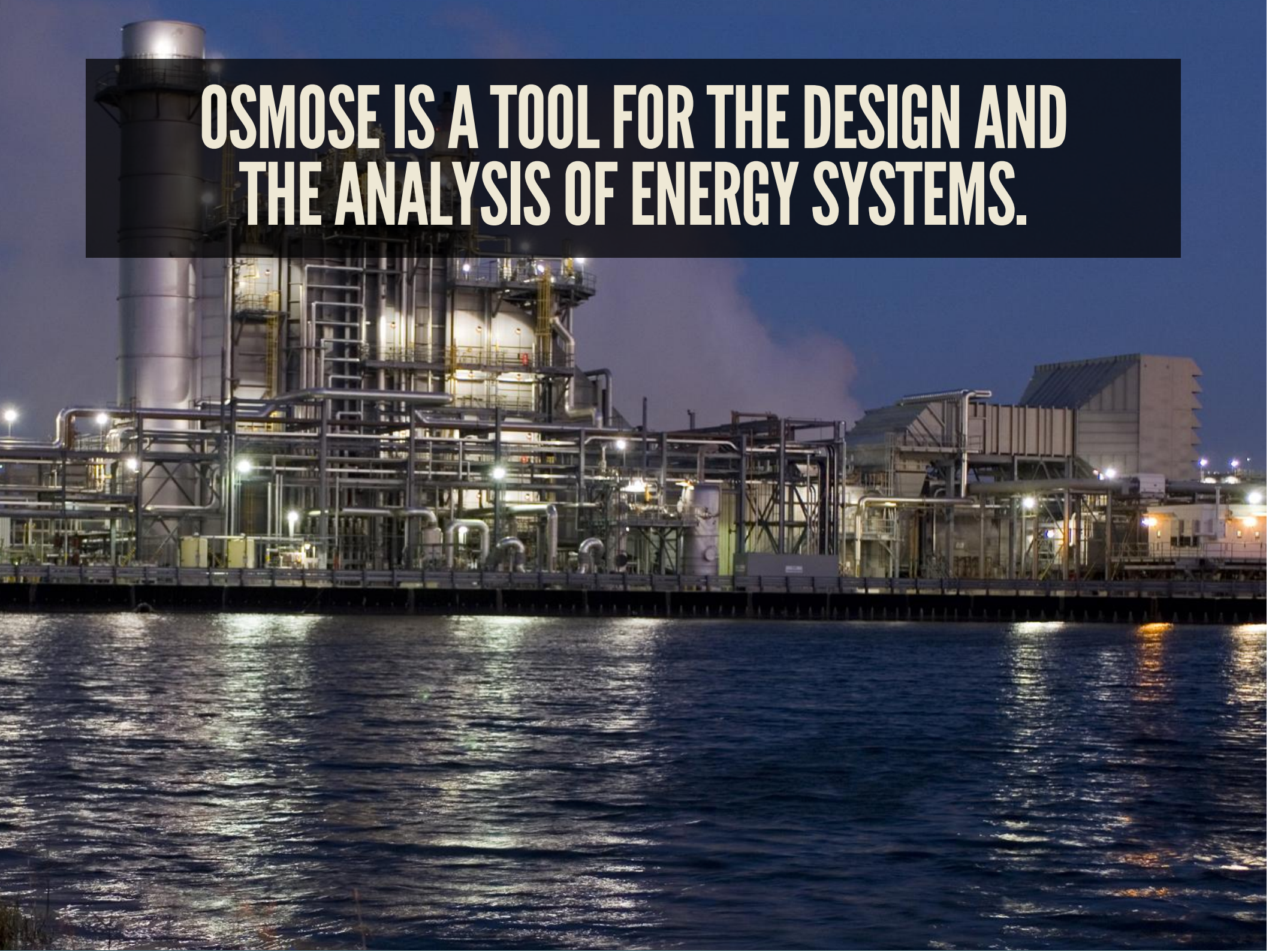
OSMOSE

MULTI-OBJECTIVE OPTIMIZATION OF INTEGRATED ENERGY SYSTEMS



Presented by Renaud Kern (Teti, Lausanne, Switzerland)


OSMOSE IS A TOOL FOR THE DESIGN AND
THE ANALYSIS OF ENERGY SYSTEMS.

PROJECT EXEMPLE

In projects/jam.lua file

```
--  osmose is also a luarock
local osmose = require 'osmose'

-- Create a project named 'Jam' of type 'MER' (Minimum Energy Requirement
local project = osmose.Project('Jam', 'MER')

-- Load some models
project:load({cip="ET.Cip"}, {utilities="ET.generic_utilities"},
{cm1="ET.CookingMixing"}, {cm2="ET.CookingMixing", with='CM2_inputs.csv'}

-- Solve with GLPK (GNU Linear Programming Kit)
project:solve()

-- Do something with the results
project:postCompute('jam_postcompute')
```

Run with

```
lua projects/jam.lua
```

MODEL EXEMPLE 1/2

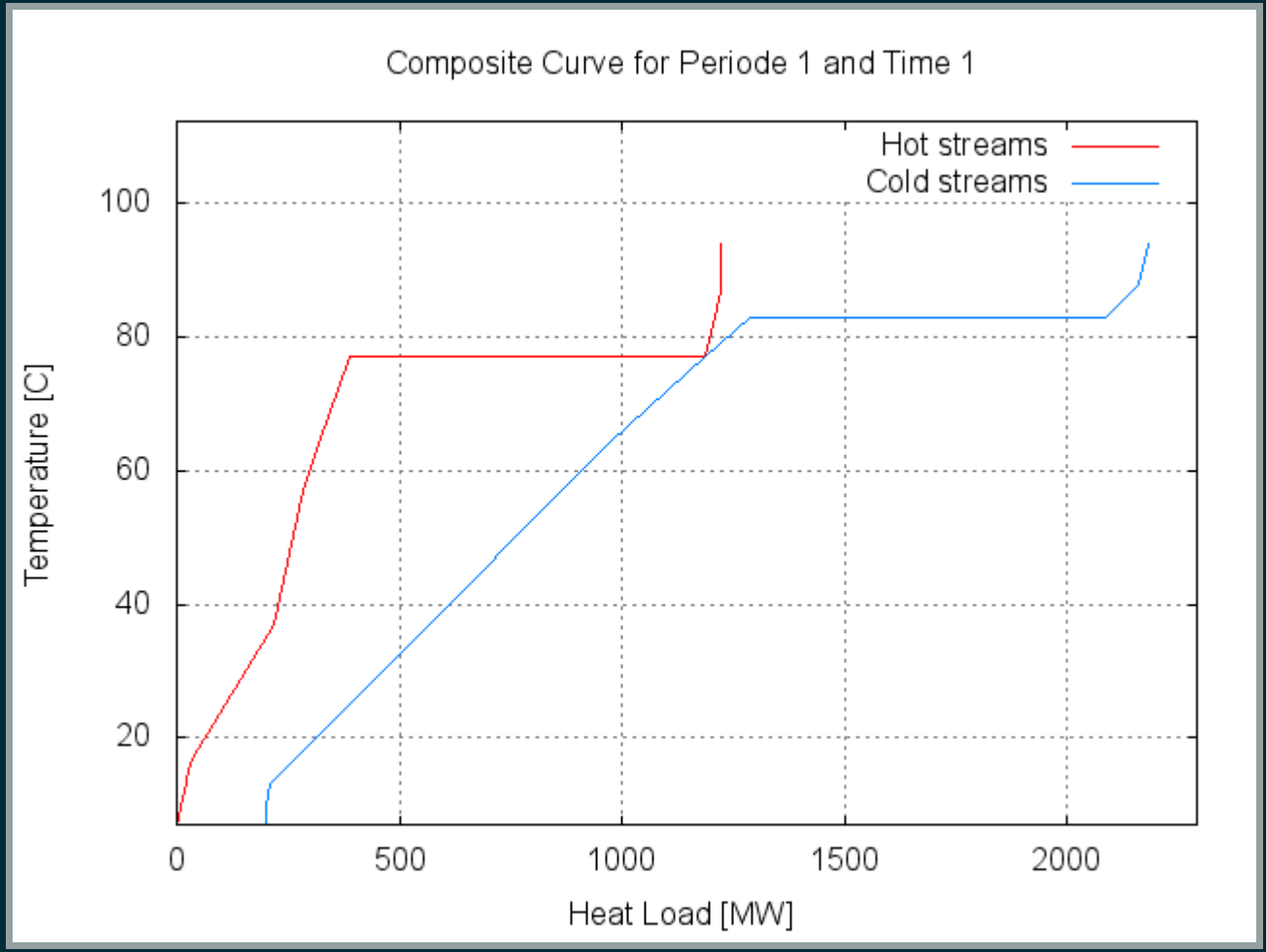
In ET/cip.lua file

```
-- Create a model
local lib = osmose.Model 'Cip'

-- Let's give some inputs in the model
lib.inputs = {
-- Percentage of the mass flowrate of the raw water that is recovered fro
raw_water_rate = {default = 50, min = 50, max = 50, unit = '%m/m'},
-- Mass flowrate of cleaning liquid distributed to the process. (CW1)
distributed_water_flow = {default = 10, min = 5, max = 10, unit = 't/h'},
}

-- Let's define some output of the model
lib.outputs = {
-- Mass flowrate of the raw water that is recovered from the process.
raw_water_flow = {unit = 't/h', job = "(raw_water_rate/100) * distributed
}
```

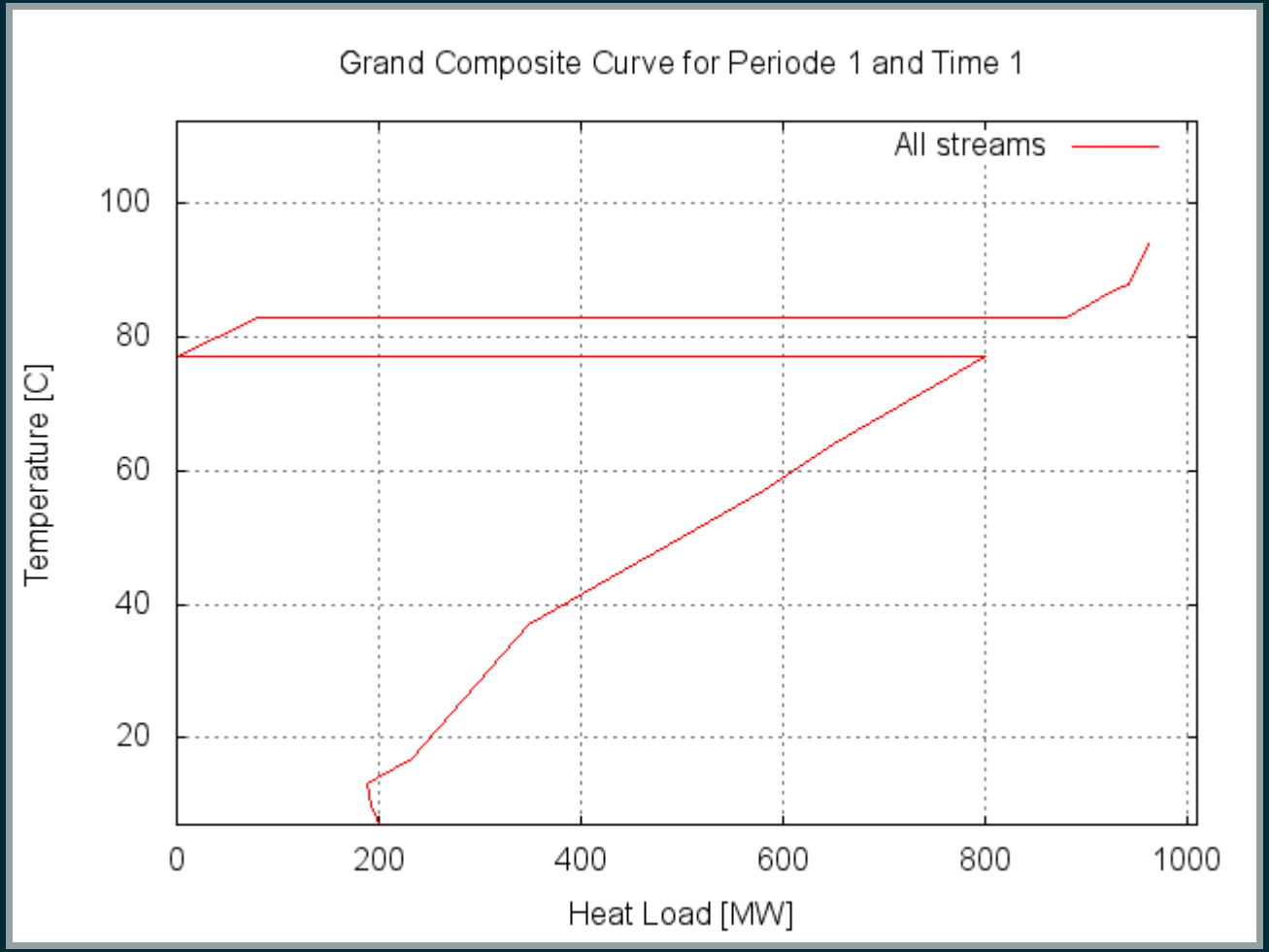
MODEL EXEMPLE 2/2

```
-- Add a unit named 'CipUnit' of type 'Process'.
-- Units define the smallest entity possible in the model.
lib:addUnit("CipUnit", {type = 'Process', addToProblem='j1'})

-- Add 3 streams to the unit.
-- Streams are supplied by heat transfert and are defined by a enthalpy-t
cip["CipUnit"]:addStreams({
cleaning_agent = qt{'cleaning_agent_temp', 0,'tank_temp','cleaning_agent_
fresh_water = qt{'source_temp', 0,'tank_temp','fresh_water_load', 3,'wate
discharge = ht{{'return_temp'},{'discharge_load'},{'max_temp'}, {0},{ 3},
})

return lib
```

EXEMPLE OUTPUT 1



EXEMPLE OUTPUT 2



EXTERNAL TOOL 1

GNU LINEAR PROGRAMMING KIT (GLPK)

GLPK (GNU Linear Programming Kit)

Introduction | Downloading | Documentation | Mailing Lists/Newsgroups | Request an Enhancement | Report a Bug | Maintainer

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Introduction to GLPK

The GLPK (GNU Linear Programming Kit) package is intended for solving large-scale linear programming (LP), mixed integer programming (MIP), and other related problems. It is a set of routines written in ANSI C and organized in the form of a callable library.

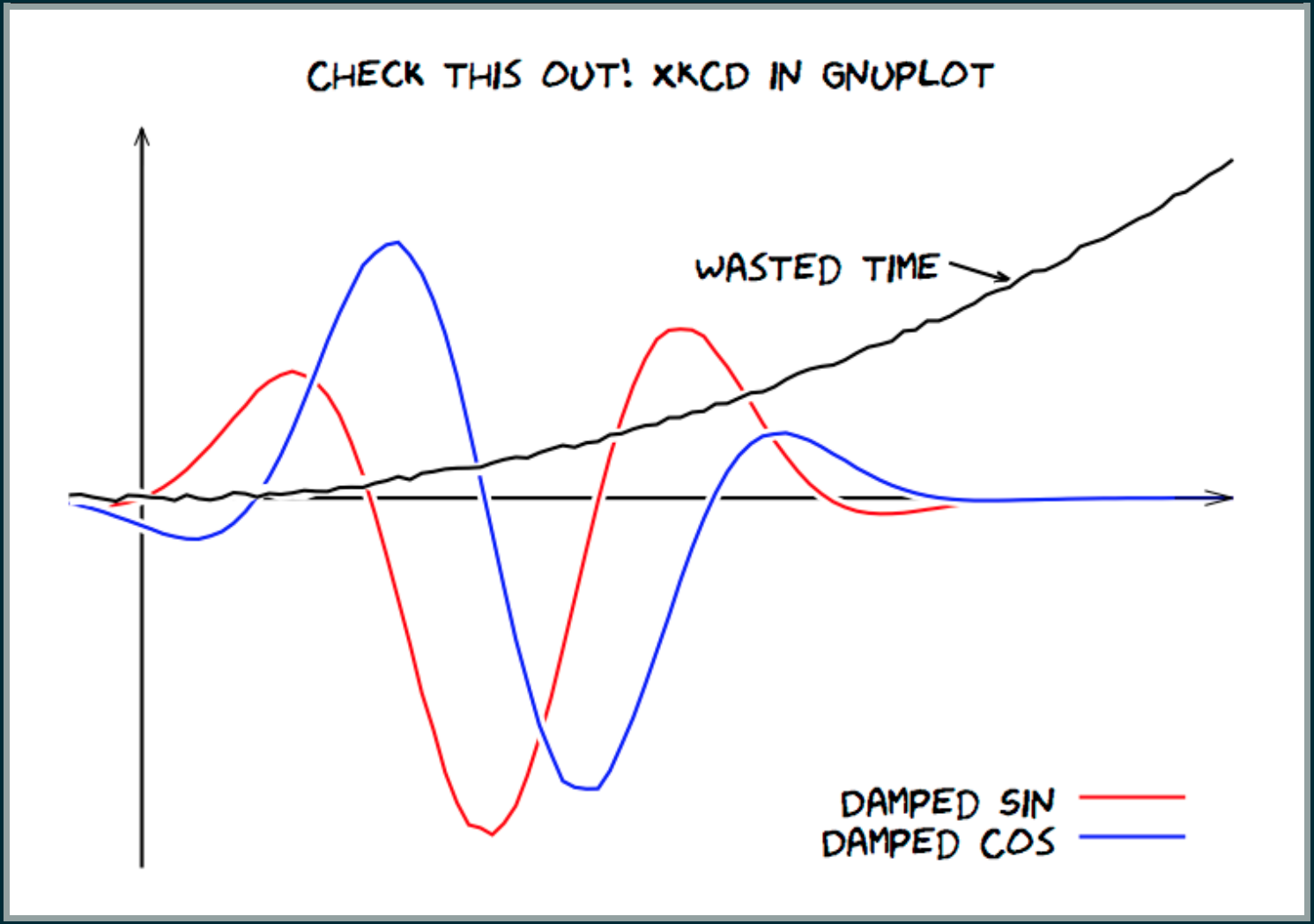
GLPK supports the *GNU MathProg modeling language*, which is a subset of the AMPL language.

The GLPK package includes the following main components:

- primal and dual simplex methods
- primal-dual interior-point method
- branch-and-cut method
- translator for GNU MathProg
- application program interface (API)
- stand-alone LP/MIP solver

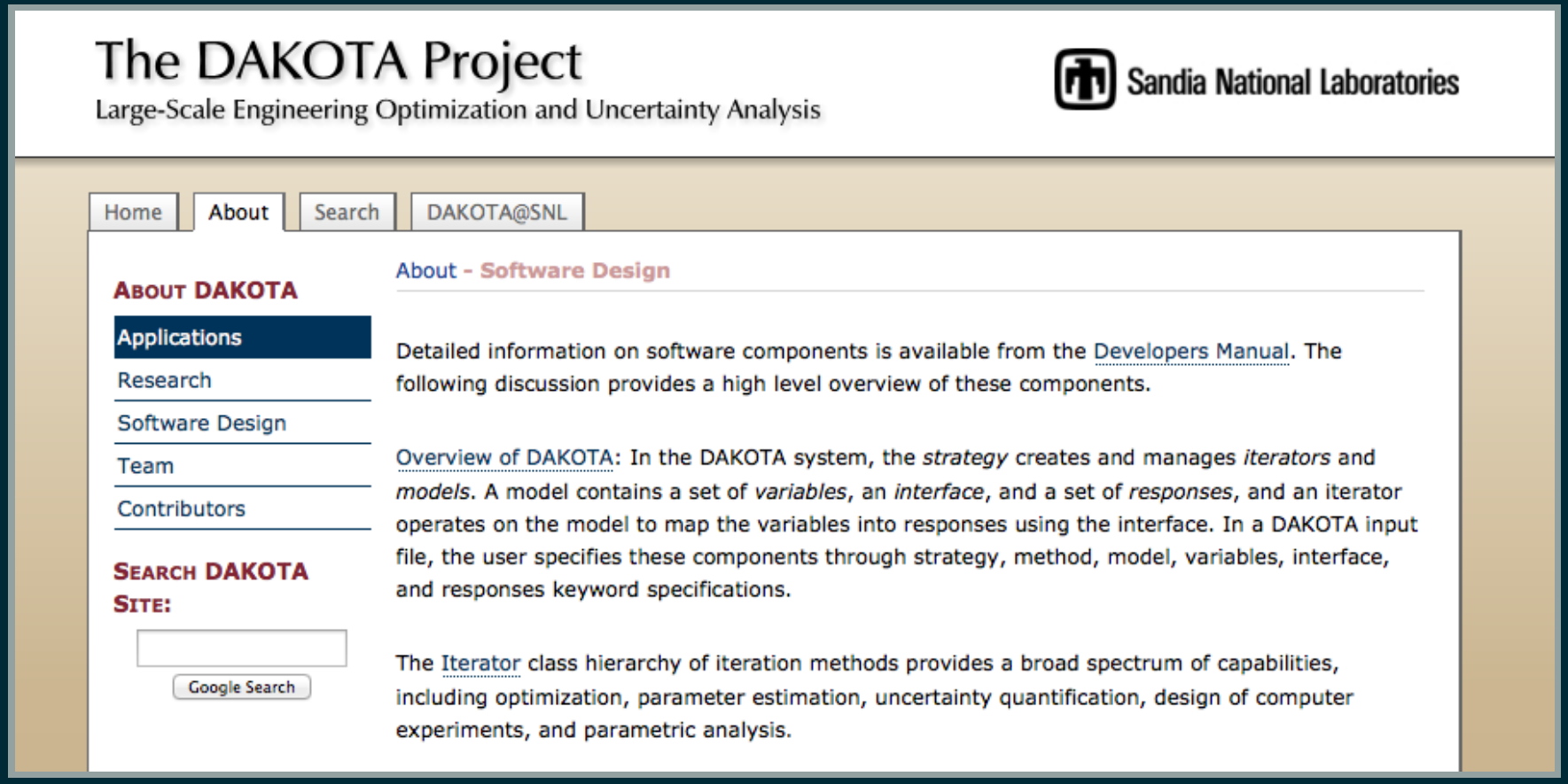
EXTERNAL TOOL 2

GNUPLOT

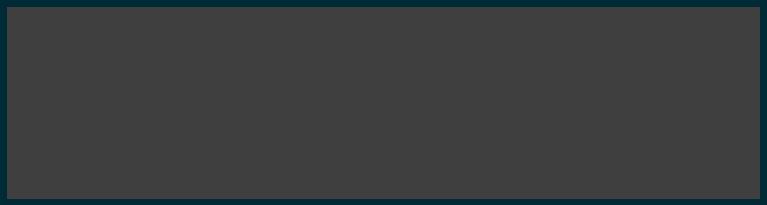


EXTERNAL TOOL 3

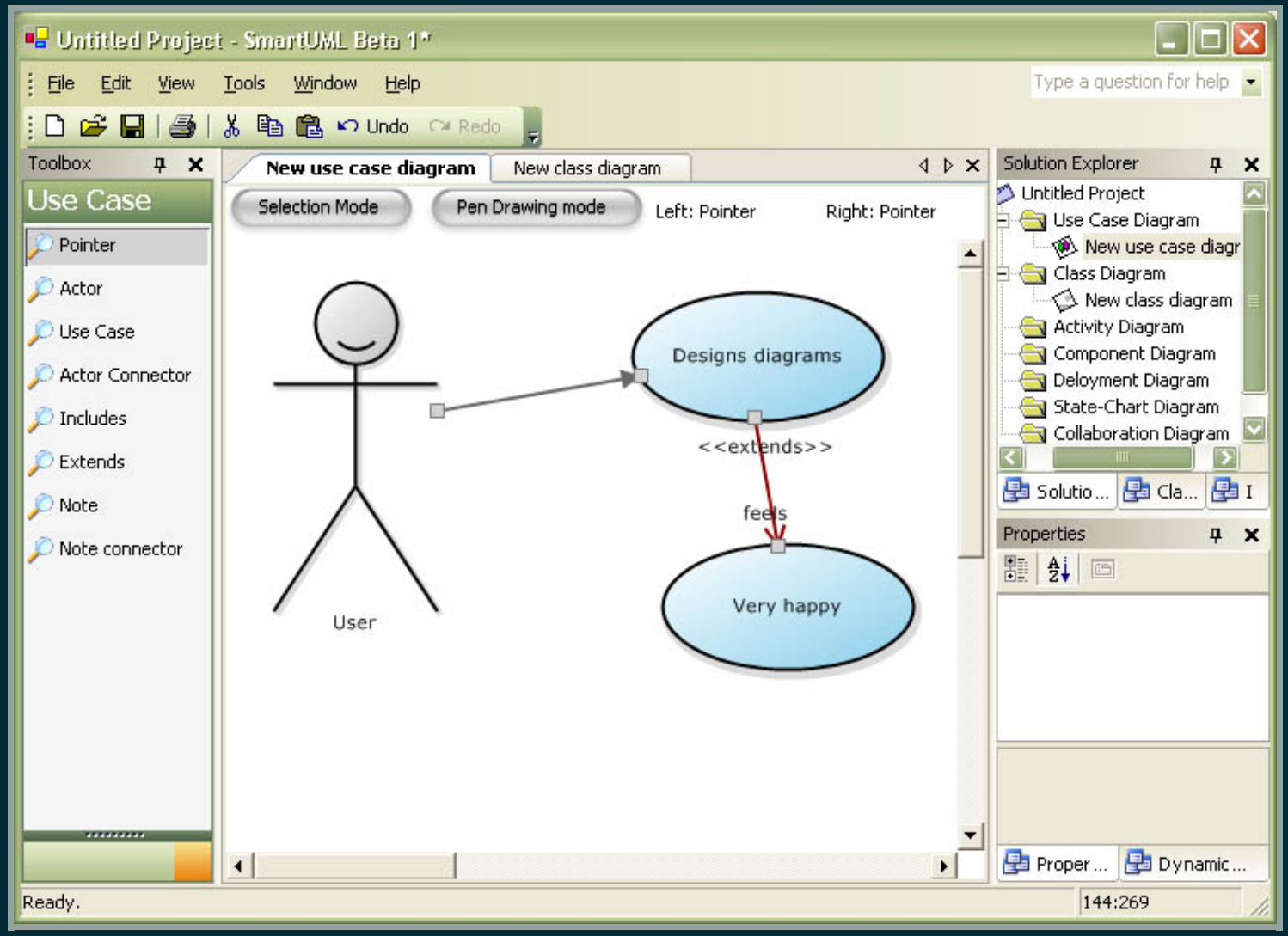
DAKOTA



BUT WHERE ARE MY EGGS?



BUT WHERE IS MY UML?

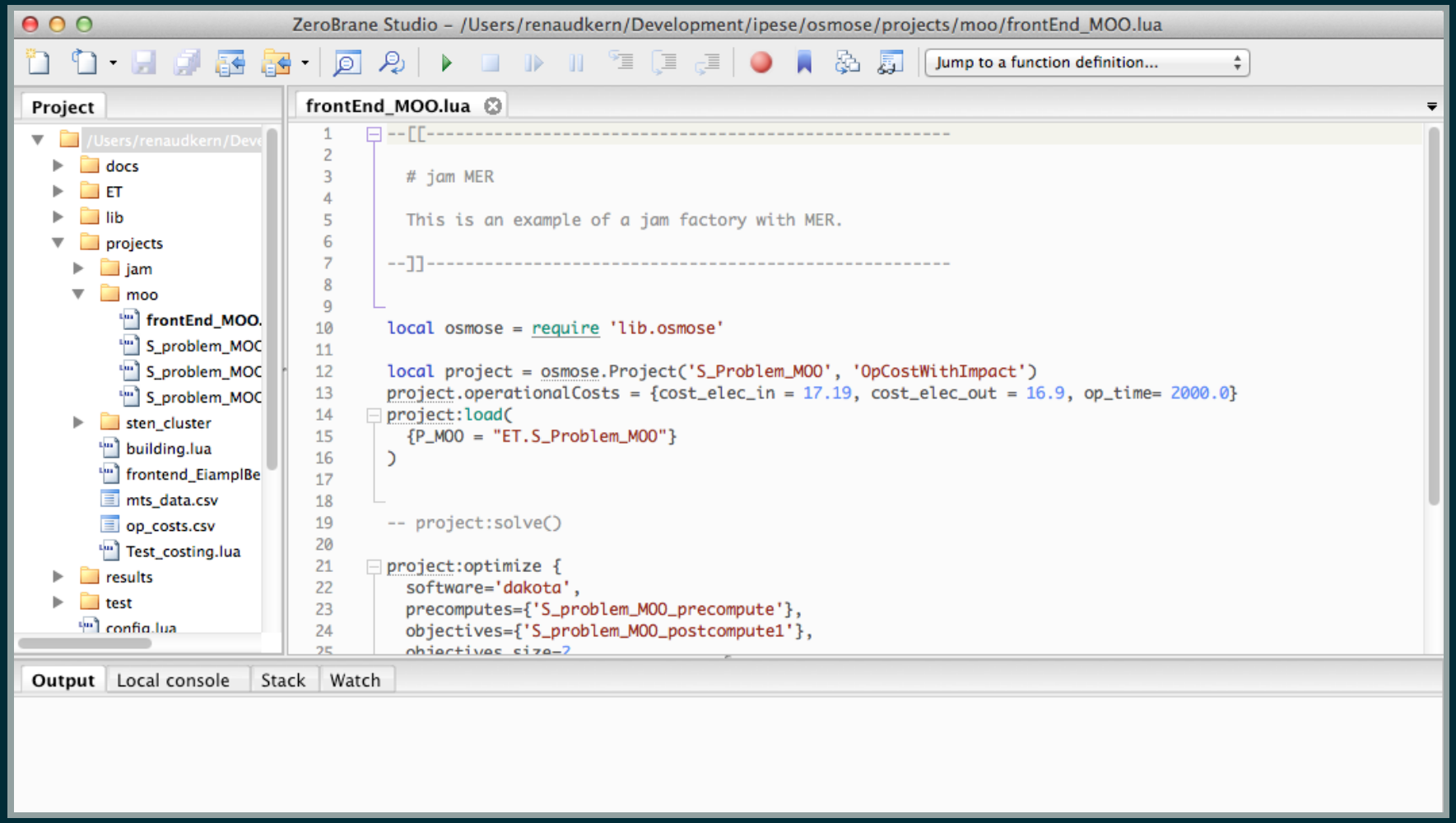


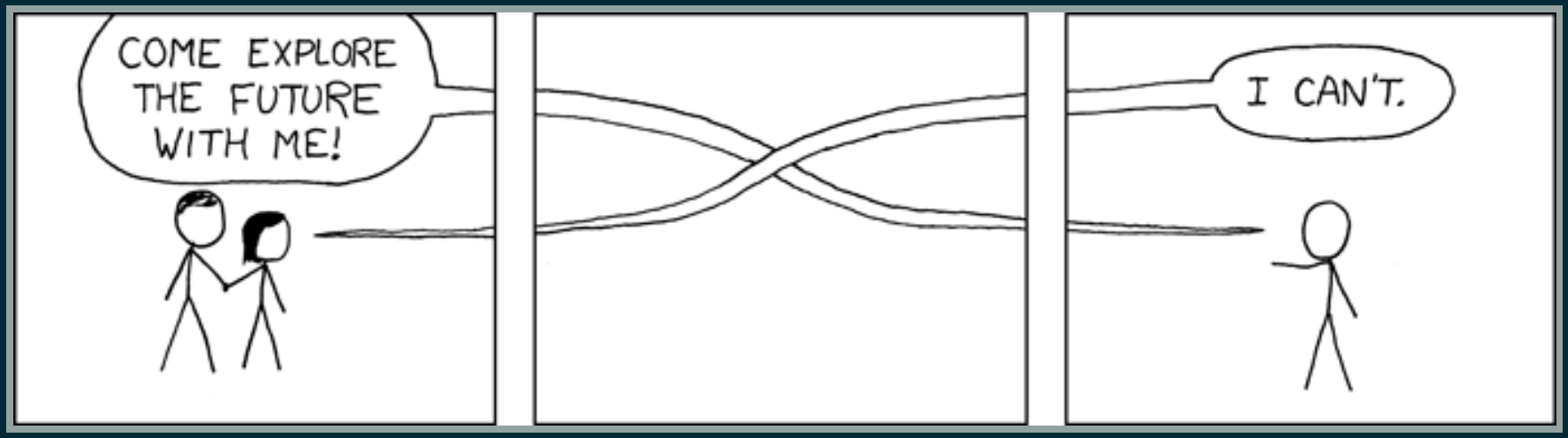
LUA FOR WINDOWS...

Libraries included

Library	Version	Description
Alien	0.5.0	Provides access to functions in an unknown or new .dll.
IUP	3.5.0	Light Portable Graphical User Interface library.
CD	5.4.1	Canvas Draw: A platform-independent graphic library.
IM	3.6.3	A toolkit for Digital Imaging.
Ex	Jan 07	Adds environment, file system, I/O (Locking and pipes), and process control.
LPeg	0.9	Pattern-matching library based on Parsing Expression Grammars (PEGs).
Lua-GD	2.9.33r2	Image manipulation library based on Thomas Boutell's GD library.
LuaCOM	1.4	Enable use & implementation of Microsoft's Component Object Model.
LuaCURL	1.0	Interface to Internet browsing capabilities based on the cURL library.
Date	2	Date and Time library for Lua.
LuaDoc	3.01	Documentation tool for Lua source code.
LuaExpat	1.1.0	Lua interface to XML Expat parsing library.
LuaFileSystem	1.4.2	Access the directory structure and file attributes.
LuaLogging	1.2.0	Logging features in Lua, based on log4j.
LuaProfiler	2.0.1	Time profiler designed to find bottlenecks in Lua programs.
LuaSocket	2.0.2	Lua interface to support HTTP,FTP,SMTP, MIME, URL & LTN12.
LuaSQL	2.1.1	Lua interface for PostgreSQL, ODBC, MySQL, SQLite, Oracle, and ADO dbms.
LuaUnit	2.0	Testing framework for Lua.
LuaZip	1.2.3	Read files from zip files.

WE NEED AN IDE





- Graphical programming
- HTTP Connection
- Parallel

THANK YOU

http://leni.epfl.ch/en

https://github.com/ipese/osmose