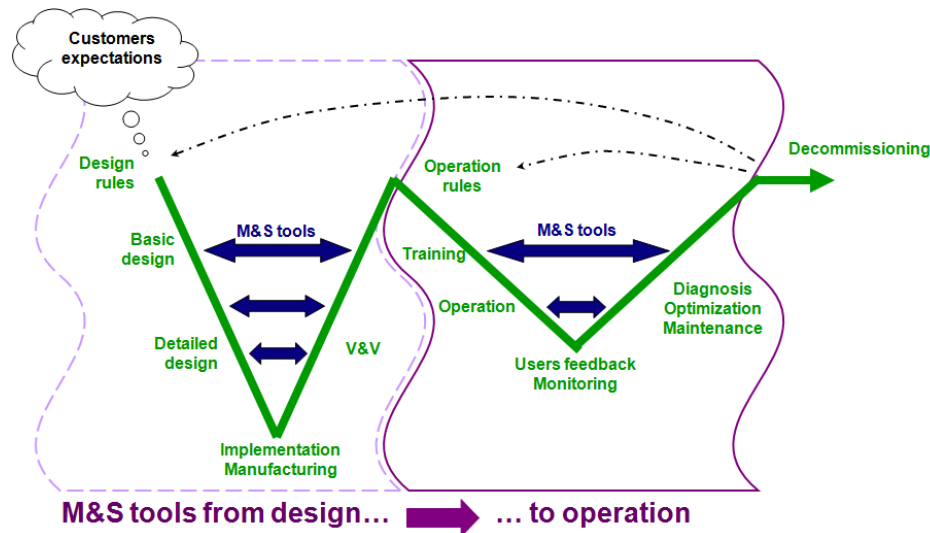




INFORMATION TECHNOLOGY FOR EUROPEAN ADVANCEMENT



MODRIO

Deliverable 6.5.4 – M24

New version of the System Dynamic Tool

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System dynamics

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- System dynamics is a methodology to understand the behaviour of dynamic complex systems of different domains using modelling and simulation.
- The modeled systems can be, e.g., socio-economic, financial, climatic, physical, ...
- System dynamic models consist of only a few basic types of variables which are used to construct stock and flow diagrams with feedback loops and delays.

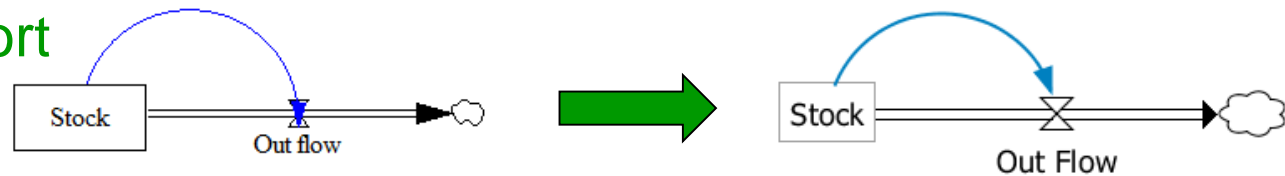
Simantics System Dynamics tool 1.8.1

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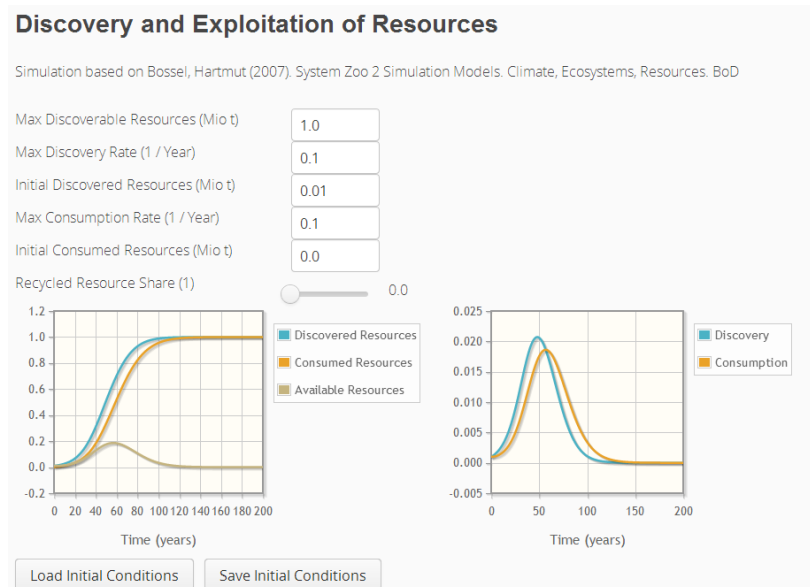
- New version of the Simantics and OpenModelica based system dynamic tool supporting business cases in WP8.
- The version update includes new features to help modelers in their basic modeling work, improves the performance of the tool, and fixes critical bugs.
- The tool is currently used in the Modrio project (WP 8.9) to develop an interactive game based on a complex workforce management model.
- Based on the activity in the support forum, the tool has recently gathered some attention and has at least several external users.

New features of 1.8.1 (since 1.7) (1/5)

- Vensim import



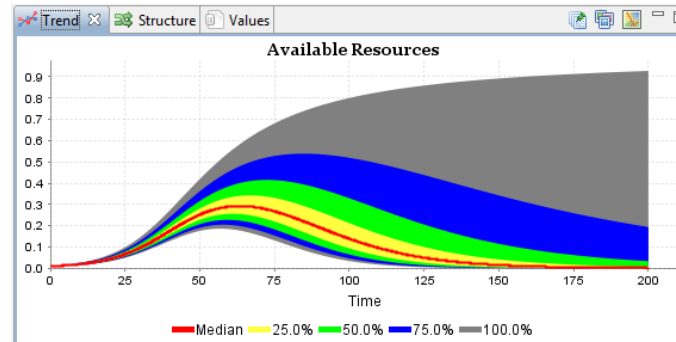
- Web user interfaces



- Internal custom Modelica solver

New features of 1.8.1 (since 1.7) (2/5)

- Sensitivity analysis



- Content assist (Ctrl+space)

`max(x,y)`
`max(e(i, ..., j) for i in u, ..., j in v)`

Returns the largest element.

The first form returns the largest element of the scalars x and y.

The second form is a reduction expression and returns the largest value of the scalar expression e(i, ..., j) evaluated for all combinations of i in u, ..., j in v

Example:
`max(i^2 for i in {3,7,6}) // = 49`

- MyVariable
- minmax(expression, minimum, maximum)
- `max(x, y)`
- `min(x, y)`
- `mod(x, y)`
- `matrix(A)`
- `max(A)`
- `min(A)`
- `MAX(a, b)`
- `MIN(a, b)`
- `MODULO(a, b)`

Stock/M

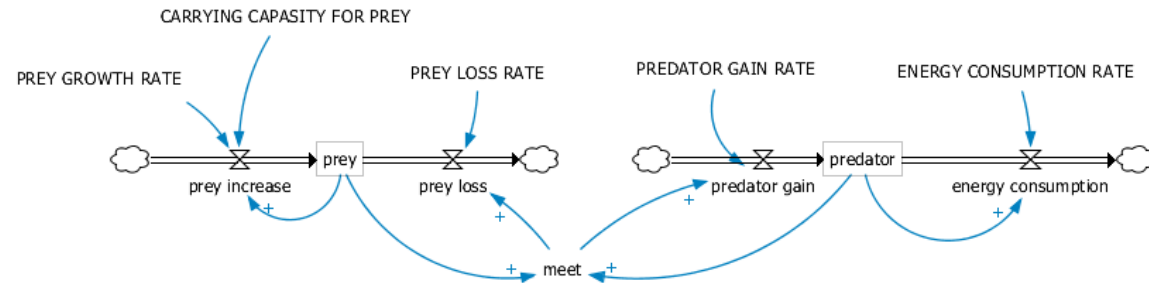
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Equation Indexes Additional Information

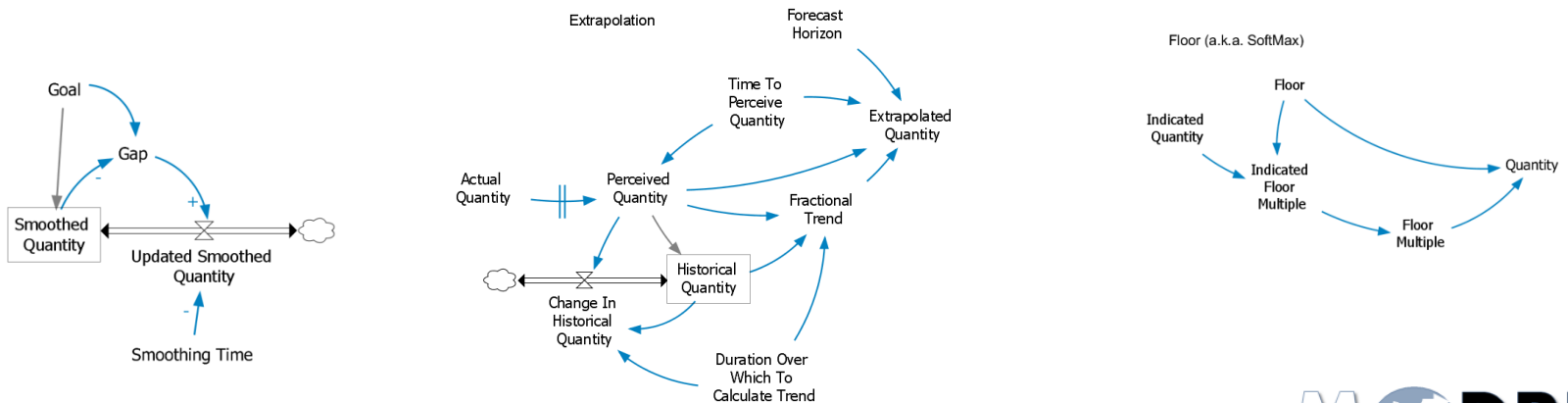
New features of 1.8.1 (since 1.7) (3/5)

- Sample model library

Predator And Limited Prey

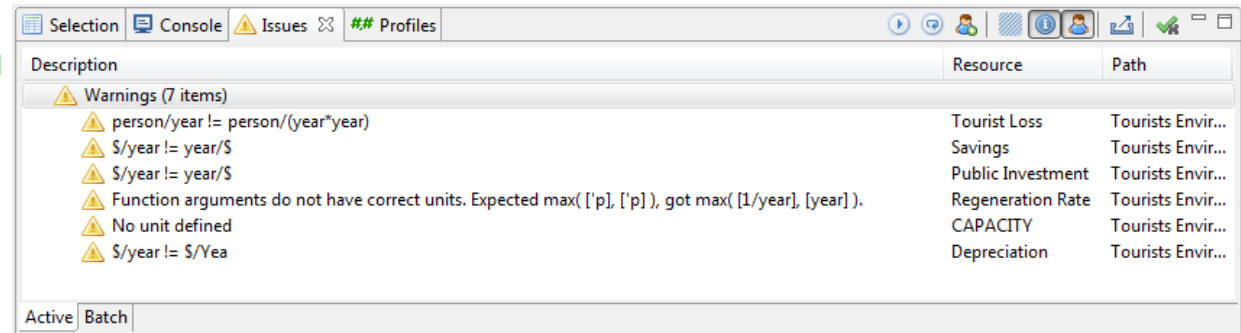


- Molecules library



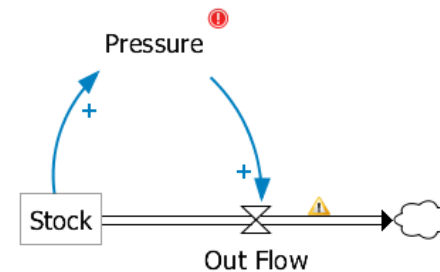
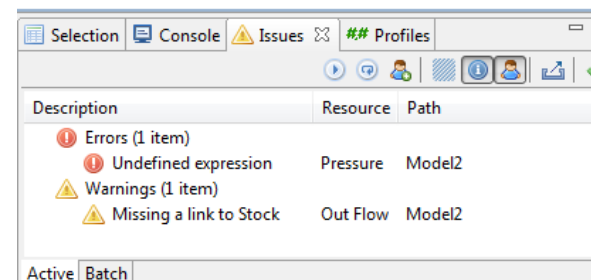
New features of 1.8.1 (since 1.7) (4/5)

- Unit validation



Description	Resource	Path
Warnings (7 items)		
person/year != person/(year*year)	Tourist Loss	Tourists Envir...
\$/year != year/\$	Savings	Tourists Envir...
\$/year != year/\$	Public Investment	Tourists Envir...
Function arguments do not have correct units. Expected max(['p'], ['p']), got max([1/year], [year]).	Regeneration Rate	Tourists Envir...
No unit defined	CAPACITY	Tourists Envir...
\$/year != \$/Yea	Depreciation	Tourists Envir...

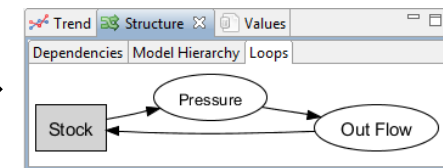
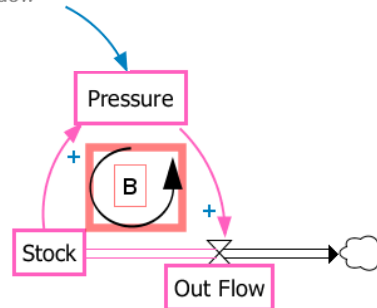
- Real-time errors and warnings

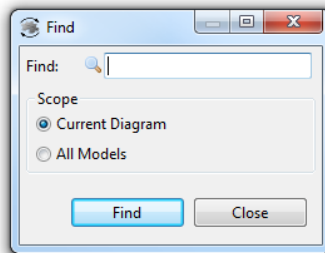
Description	Resource	Path
Errors (1 item)		
Undefined expression	Pressure	Model2
Warnings (1 item)		
Missing a link to Stock	Out Flow	Model2

New features of 1.8.1 (since 1.7) (5/5)

- Shadow variables
- Loop visualization
 - Loop tool
 - Structure analysis



- Resizable diagram elements
- Search



- Custom stock functions

Simantics System Dynamics 1.8.1

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- Download:
<http://sysdyn.simantics.org/>
- Demo video of the new features:
<http://youtu.be/7yxD0Mf7-sk>
- Documentation:
https://www.simantics.org/end_user_wiki/index.php/Simantics_System_Dynamics
- Simantics System Dynamics Forum:
<https://www.simantics.org/sysdyn-forum>