



A users view of ThermXL

Problem:

- Hypobaric plant growth chamber project by the University of Guelph, CA, plant Growth under extreme conditions (Temperature, pressure (0.1-1bar)
- Temperature/Humidity under different environmental conditions (day/night cycles)
- Thermal Analysis needed to check the Design, fast response
- No extensive experience with standard Thermal S/W (ESATAN)

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sheet 1



The model

- water transpiration from plants
- Illumination from Natrium lamps modeled as heatsource and boundary node (illumination glass temperature)
- Condenser & Heat exchanger for Temperature & Humidity Control modeled as heat sink/source
- 42 nodes

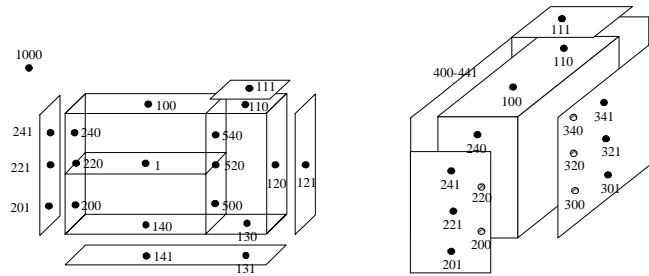
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sheet 2



Nodal Breakdown (1) Structure



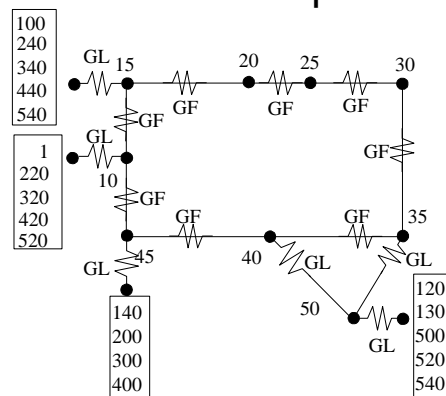
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sheet 3



Nodal Breakdown (2) Fluid Loop



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Which tool?

- EcosimPro
- Esatan
- ThermXL

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Choice of Tool

ThermXL was the tool of choice due to

- Fast implementation
- Learning curve not “obstructed” by Data Handling etc.

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Results

- Heat dissipation assumed by the Designers are too high (cooked veggies) => check design & assumption about heat input
- First guidelines for the dimensioning of the Condenser/Heater
- First guidelines for humidity levels dependant on pressure



Downsides

- Calculation did not converge with the steady state Solver, why?
- Implementation of thermohydraulic Calculations/Humidity Control time consuming, no predefined Routines available



ESTEC
Analysis and Verification section



Conclusions

- ThermXL is an easy to use tool for a first assessment
- Ideal for getting started with Nodal networks
- Data presentation and postprocessing easy
("everybody knows Excel...")