Appendix T

SYSTEMA - THERMICA

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Abstract

The Systema-Thermica software supports engineers in facing the present and future challenges of space thermal analysis. Several improvements and new features were recently implemented.

First of all, the Systema 3D engine efficiency was raised up to ten times by using an optimized rendering mode. This performance boost enables the modelling of complex thermal behaviors on large models with more than 80 000 meshes.

Simulations with uncertainties on input parameters are made more flexible using advanced parametric analysis. Systema-Thermica provides advanced variables defined with inter- dependencies as well as user-defined GUI to set Python scripts parameters values on the fly.

Besides, a deep rework of cutters management enabled the definition of both finite and infinite cutting shapes including transformations. Users can choose between inside or outside cuttings. These features being Step-TAS-compatible, sharing the resulting geometry with other tools is straightforward.

Enhancements were also performed on various thermal analysis topics such as sensors modelling, infrared camera management and thermal convection, which helps analysists in providing their expertise over a wider set of thermal phenomena.

Finally, a detailed study on a large panel of Systema users, revealed some promising improvement opportunities in the Systema GUI ergonomics. Various improvements are scheduled to facilitate the training of novice users and increase the efficiency of experts.







- Possibility of stratification within fluid cavities
- \rightarrow Ongoing work of stabilization
- → These modules will be included in the next release of Systema (4.8.2)
- · Perspectives: prepare the next Long Term Support Version (LTS)
- Stabilize current functional thermal scope
 - Improve the User Manual coverage

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 $GL(I,J) = k.S.\Delta T^{\alpha}$ Surface/Air conducto-convective coupling



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→Systema proposes a boosted 3D rendering algorithm to enable easy manipulations of large models

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Radiator Systema meshing, designed for small condensers/heaters (~67 000 meshes)









