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Mechanical behavioral analysis of 3D printed hybrid cellular structures

Hybrid Electric Propulsion (HEP) is becoming an emerging field in the aerospace industry on account of its contribution towards reducing transport emissions. HEP system architectures are sophisticated and encompasses several thermal components. Heat Exchangers are an important component of HEP architecture and contribute significantly towards temperature moderation. Heat exchangers in HEP system architectures have relatively sophisticated heat transferring components to allow for higher heat transfer and facilitate better cooling. The current task would focus on the structural analysis of some novel structures for heat exchangers.

Overview:

- Supervision and assistance in mechanical testing of hybrid cellular structures
- CAD modeling, e.g. SolidWorks, NX, etc. to design test specimens
- Simulations for mechanical analysis and theoretical structural analysis (ANSYS)
- Theoretical evaluation and selection from novel hybrid geometries based on structural performance after simulation result post-processing
- Heavy design analysis (possible design optimization) is required for critical evaluation and selection of design for good structural performance.
- Possible design optimization could be achieved via MATLAB or Python as suited.
- Post-processing of experimental results from mechanical testing.
- Initial mechanical testing of tensile, compression and 3-point bending. Further Low Cycle Testing based on initial mechanical test results.
- Required supervision would be provided by respective PhD students.



References:

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