Ministère de l'Enseignement Supérieur et de la Recherche Scientifique.
Université de Batna-2- Mostefa Benboulaid
Faculté de Technologie
Département de Génie Mécanique

Département de
GENIE MECANIQUE

FICHE TECHNIQUE PFE Master2

Filière : Energies renouvelables **Spécialité: Energétique** **Année Universitaire : 2023-2024**

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Thème :

Automated Heat Sink Design, Thermal and Dynamic Analysis Using FreeCAD

Problématique

The study of conjugated heat transfer (fluid-thermal coupling) in heat sinks is very complicated and resource intensive. The aim of this study is to prepare these heatsinks for a thermal and then dynamic study. In the first part of this work, the aim is to automate the design of different heat sinks (rectangular, circular, etc.) according to different design parameters. The second part concerns the study of the stationary and unsteady heat transfer of these heatsinks. The last part will be devoted to the dynamic study in laminar and turbulent regime without heat transfer. The tool used in this work is the free 3D parametric Modeler software "FreeCAD" whith its included workbenches specialized in CFD simulation based on "OpenFOAM" solver and thermal analysis based on "CalculiX" solver.

Plan de travail

1- Bibliographic study on heat sinks and choice of the models to study.
2- Getting started with "*FreeCAD*", "*CfdOF*", "*FEM*" and "*ParaView*".
3- Automated design of the chosen heatsinks models with "*FreeCad*".
4- Stationary and unsteady thermal analysis with "*FEM*".
5- Dynamic study of laminar and turbulent flow with "*CfdOF*".
6- Visualization of the results with "*ParaView*".
7- Writing the dissertation with "*LibreOffice*" software.

Adjoint Chef de département chargé de la pédagogie	**Engagement de l'encadreur 18/09/2023**	**CSD / Génie mécanique.**