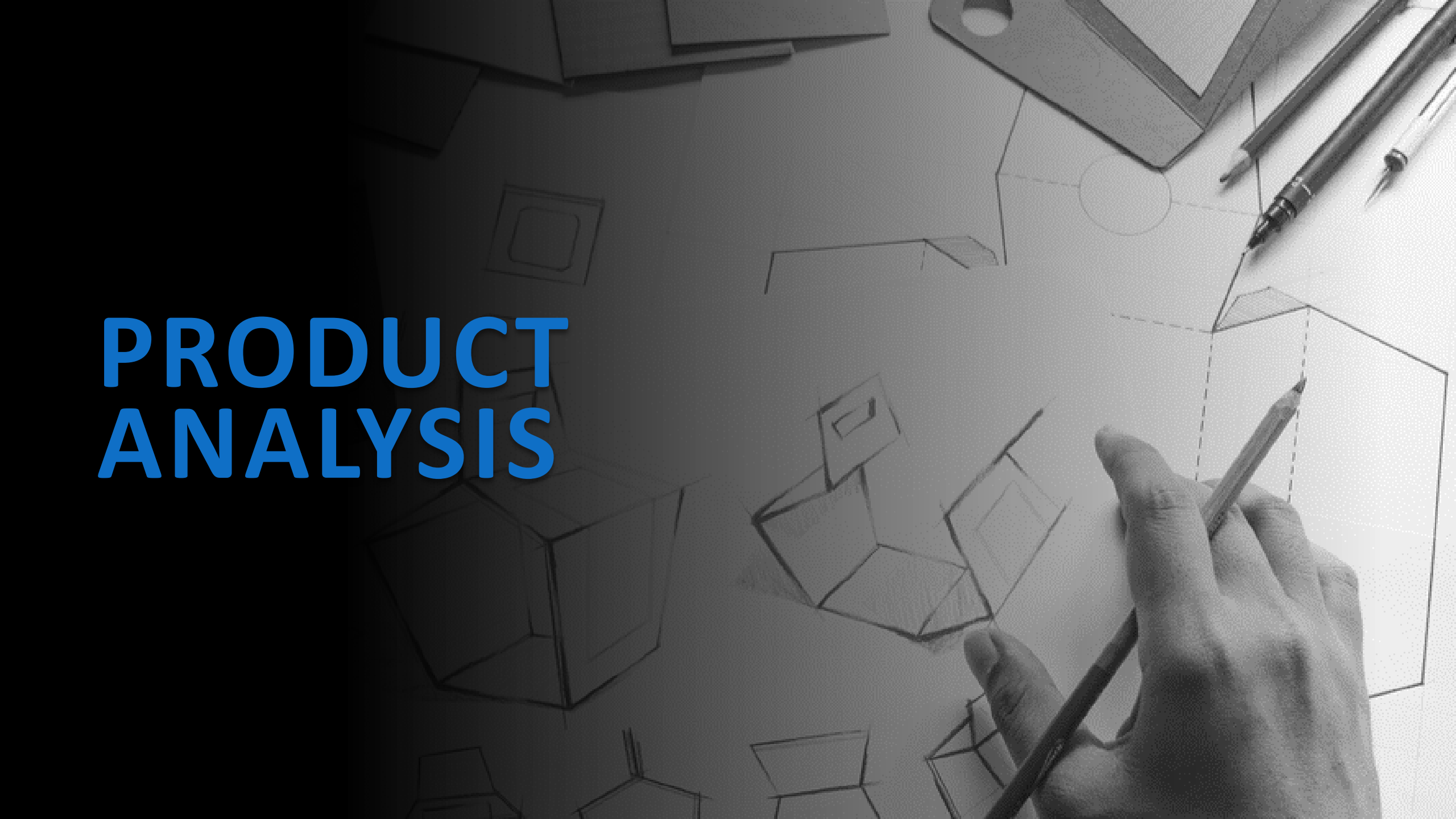
PRODUCT ANALYSIS



Plant modelling | Motor control | MBD

TATA ELXSI

Development of washing machine plant model and controller algorithm using MATLAB/Simulink environment

SCOPE

- Washing machine plant model development taking into account mechanical, electrical and hydraulic aspects
- Control algorithm development to reduce the vibration of the washing machine tub during spin stage at lower speed
- Integration of the controller model with the hardware through Autocode generation
- Validation and verification of vibration for multiple series of Washing machines

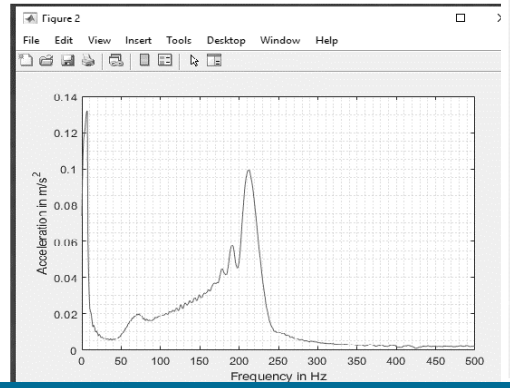
CHALLENGES

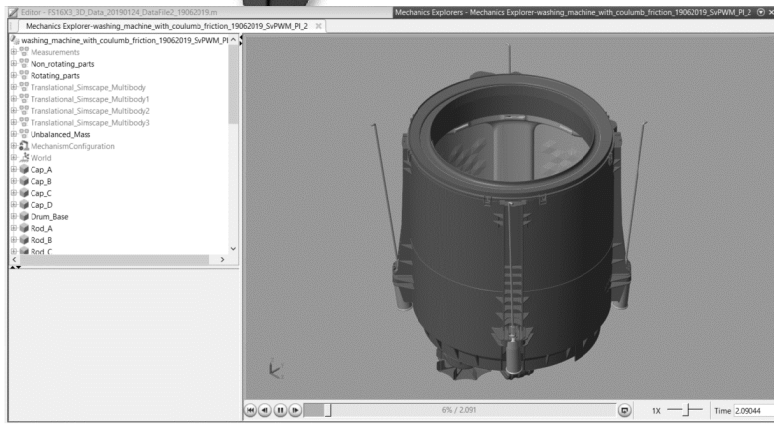
- Setting-up a data acquisition system with oscilloscope that fetches information about washing machine like acceleration, displacement etc.
- Developing plant model in Simscape environment that mimics the behavior of the washing machine. Parameter estimation is one of the complexities encountered.
- Finding speed profiles for the controller that effectively deals with the vibration control

TOOLS AND TECHNOLOGIES

- Matlab/Simulink (Simscape Electrical, Multibody, Design Optimization, Parameter Estimation)
- TI evaluation board with CCS software

MODEL BASED DESIGN APPROACH FOR WASHING MACHINE VIBRATION MODELLING AND CONTROL





Product phase

In market

TATA ELXSI

Development of washing machine plant model and controller algorithm using MATLAB/Simulink environment

SCOPE: Perform Flow & Thermal Analysis of Refrigerator and validate the analysis results with test data.

CLIENT: Home Appliances Manufacturer

DESCRIPTION: Conjugate Heat Transfer Analysis of refrigerators consisting of multiple solid and a fluid domains.

INPUTS: CAD model, environmental conditions

CFD TOOL: Helyx, SCRYU Tetra, Openfoam

DELIVERABLES: CFD analysis report with details of flow and temperature distribution, test validation report

CHALLENGES: Huge number of components, Multiple domains with heat interaction, Maintaining a good quality mesh in the duct region through the foam, slow convergence.

EXTRA MILE (BEYOND SCOPE): Recommendations for tray and basket design improvement to get faster cooling in tray areas

CFD ANALYSIS OF TOP AND BOTTOM FREEZER REFRIGERATOR MODELS