Model-based development for transmission power flow dynamics

Context

A leading Japanese agriculture equipment manufacturing company pioneering innovative transmission solutions and automotive technology sought to improve the performance of its agricultural machinery product line. They required expert assistance in model-based development (MBD) to define intricate power flow dynamics for transmission systems and achieve efficiency and productivity.

Challenges

→ Defining power flow dynamics for transmission was challenging for the client, requiring intricate modelling and simulations.

→ Accurately modelling the system while accounting for critical assumptions on material properties, shaft dimensions, inertia calculations, and other critical parameters.

→ Navigating the complexities of new concepts, parameter calculations, and duty cycle specifications.

Robosoft services

→ Conducted transmission analysis, gearbox tribology, gearbox simulation, and optimized gear ratios to enhance transmission efficiency and performance.

→ Defined power flow of transmission systems and analyzed duty cycles through parameter calculations for modelling, ensuring accurate representations of real-world scenarios.

→ Defined material properties of the system, accounting for component durability and ensuring precise system modelling.

→ Developed simulation models, enabling precise analysis and visualization of transmission system behaviour.

→ Employed M-scripting to automate processes, perform calculations, streamline workflows, and enhance overall efficiency.

→ Conducted extensive testing and validation at various levels, including transmission unit testing, engine unit testing, system testing, TestMap, TestSystem, fuel consumption map, and test gear stage.

→ Provided detailed documentation for the entire project, including template generation, component-level reports, and system-level reports, ensuring future maintainability.

Value delivered

→ Completed the proof-of-concept (POC) within the designated timeline.

→ Seamlessly integrated new concepts during the development process, showcasing agility and adaptability.

→ Delivered a comprehensive final report, demonstrating our expertise and innovative solutions employed throughout the project.

Key technologies

→ MATLAB
→ Simscape
→ Simulink

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