

# Seat Motor Design Optimization

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## Abstract

In this work, the production intent design of a motor with controller inside a car seat for head restraint function is analyzed and optimized using the COMSOL Multiphysics® software and the Application Builder. Parameter based multiscale FEA models were developed by using external CAD and COMSOL. Component and system level simulations were performed to guide design optimization and development. Single and multi-physics analysis performed including geometry optimizations for meeting product mechanical load requirement, EM design optimization for motor, thermal design optimization of the assembly to meet environmental endurance, acoustic analysis for meeting NVH requirement and fatigue analysis to meet durability requirements. Other general analysis also performed include: mechanical strength, rotor dynamics, thermal expansion and interference fit, thermal stress, etc.