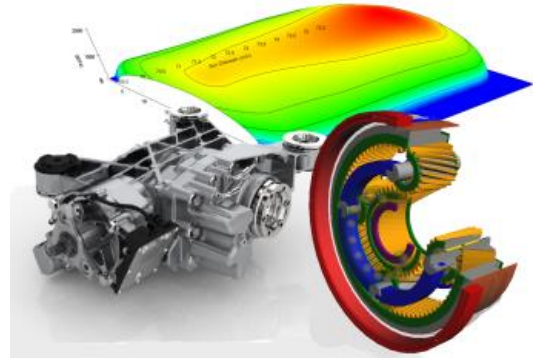


Design of a disconnect clutch and actuator for a 48V P4 electric-drive transmission

Background

Energy efficiency and CO₂ reduction are two of the main focus areas when we develop the driveline systems for the future. Important elements in reaching the targets of CO₂ reduction are hybridization and electrification of vehicles. BorgWarner currently manufactures EV transmissions for both hybrid and electrical vehicles and we are continuously evaluating new technologies for our future products.



Challenge

- Develop a disconnect system for a Mild hybrid eAxle
- Concept development and calculations to support each concept
- Perform calculations to understand connect/disconnect times

The work will preferably be conducted at BorgWarner in Landskrona and is suitable for 1-2 person.

Areas of focus are design and product development.

Reporting

The master thesis shall be reported as a written report, a simulation model, and an oral presentation at BorgWarner.

Contact Person

Warren Bates

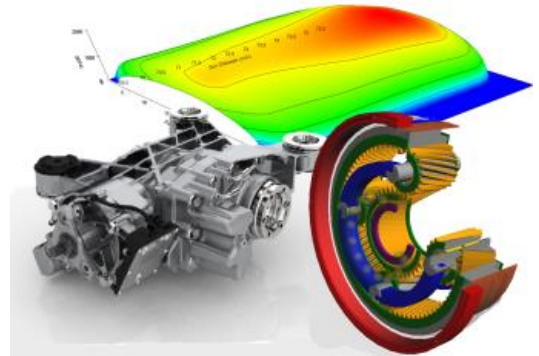
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Cost estimation model for transmissions to estimate manufacturing costs early in concept phase

Background

Energy efficiency and CO₂ reduction are two of the main focus areas when we develop the driveline systems for the future. Important elements in reaching the targets of CO₂ reduction are hybridization and electrification of vehicles. BorgWarner currently manufactures EV transmissions for both hybrid and electrical vehicles and we are continuously evaluating new technologies for our future products.



Challenge

- Develop a model which can estimate manufacturing cost of components in a transmission
- The model shall take into account the different manufacturing steps and complexity of components

The work will preferably be conducted at BorgWarner in Landskrona and is suitable for 1 person.

Areas of focus are manufacturing and production.

Reporting

The master thesis shall be reported as a written report, a simulation model, and an oral presentation at BorgWarner.

Contact Person

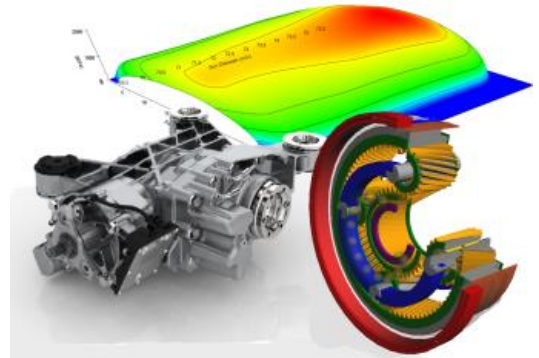
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Actuator model of latest generation AWD coupling

Background

BorgWarner's AWD coupling features an integrated electronic control unit with vehicle dynamics software that can be adapted to the customer's requirements for unique driving characteristics. Optimized for practically all driving conditions and only providing the requested amount of torque to the rear axle, the coupling's electronically controlled wet multi-plate clutch allows the torque distribution to be automatically varied between the front and rear axle.



Challenge

- Create a model of the electric motor of the actuator
- Modelling will be done in AMESim
- The work shall also include coupling the motor model to an existing model of the axial piston pump
- Perform a sensitivity analysis with different design parameters

The work will preferably be conducted at BorgWarner in Landskrona and is suitable for 1 persons.

Areas of focus are analysis and simulations.

Reporting

The master thesis shall be reported as a written report, a simulation model, and an oral presentation at BorgWarner.

Contact Person

Warren Bates

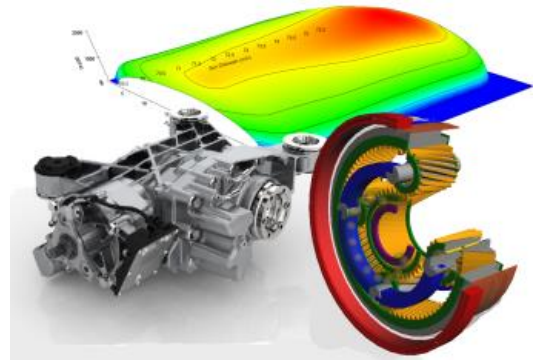
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A study of high-speed gearing systems from a tribology perspective

Background

Energy efficiency and CO₂ reduction are two of the main focus areas when we develop the driveline systems for the future. Important elements in reaching the targets of CO₂ reduction are hybridization and electrification of vehicles. BorgWarner currently manufactures EV transmissions for both hybrid and electrical vehicles and we are continuously evaluating new technologies for our future products.



Challenge

- Investigate the demands placed on the lubrication oil when running gears at very high speeds
- Using gear contact theory (flash point, etc.) to determine a minimum oil flow through a mesh at different speeds and oil viscosities
- Effect of speed on Efficiency & Losses (Optional)

The work will preferably be conducted at BorgWarner in Landskrona and is suitable for 1-2 persons.

Knowledge of involute gear design and tribology is preferred.

Reporting

The master thesis shall be reported as a written report, a simulation model, and an oral presentation at BorgWarner.

Contact Person

Warren Bates

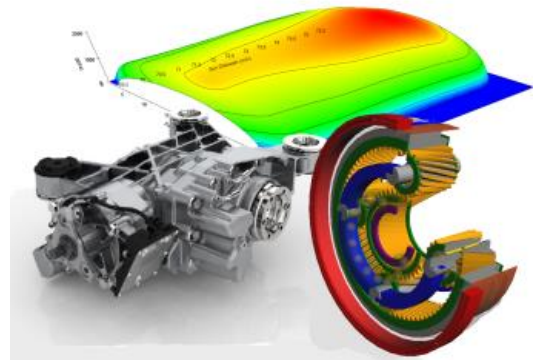
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A method for developing stress-strain relationship using Nanoindentations

Background

Energy efficiency and CO₂ reduction are two of the main focus areas when we develop the driveline systems for the future. Important elements in reaching the targets of CO₂ reduction are hybridization and electrification of vehicles. Material models with better accuracy can be used to optimise the size and weight of components. This will have a direct impact on the fuel efficiency of the vehicle.



Challenge

- Perform testing on typical materials used for high volume production, this includes hardened steels, aluminium materials, plastics
- Analyse the data from testing
- Create a model which converts the results from testing to the stress-strain relationship of the material

The work will preferably be conducted at BorgWarner in Landskrona and is suitable for 1-2 persons.

Areas of focus material science.

Reporting

The master thesis shall be reported as a written report, a simulation model, and an oral presentation at BorgWarner.

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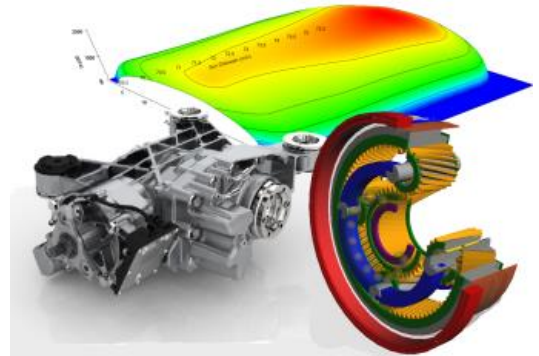
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Comparison of a multi-speed transmission to a single-speed transmission in terms of cost, performance and battery range

Background

Energy efficiency and CO₂ reduction are two of the main focus areas when we develop the driveline systems for the future. Important elements in reaching the targets of CO₂ reduction are hybridization and electrification of vehicles. BorgWarner currently manufactures EV transmissions for both hybrid and electrical vehicles and we are continuously evaluating new technologies for our future products.



Challenge

- Develop a model which estimates the performance of an electric vehicle based on known input parameters.
- Using the model create a comparison of various transmission layouts; concentrating on a single reduction, and multiple speed to determine a cost/performance curve and sweet-spot.

The work will preferably be conducted at BorgWarner in Landskrona and is suitable for 1-2 persons.

Reporting

The master thesis shall be reported as a written report, a simulation model, and an oral presentation at BorgWarner.

Contact Person

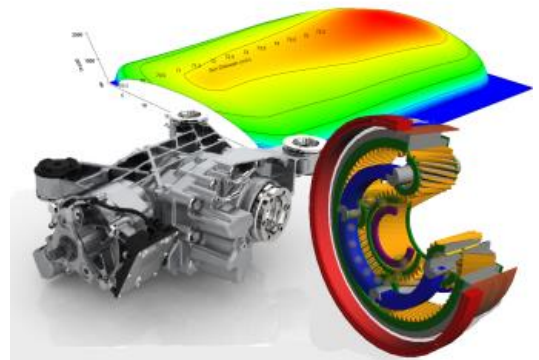
Kristoffer Nilsson
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Simulation and evaluation of a 'Smart Thermal Management System' to heat the transmission to working temperatures quickly using heat from power electronics

Background

Energy efficiency and CO₂ reduction are two of the main focus areas when we develop the driveline systems for the future. Important elements in reaching the targets of CO₂ reduction are hybridization and electrification of vehicles. BorgWarner currently manufactures EV transmissions for both hybrid and electrical vehicles and we are continuously evaluating new technologies for our future products.



Challenge

- Develop a simulation model that predicts the efficiency of an electric vehicle transmission at different temperatures.
- Determine if a 'smart thermal management system' can offer an advantage in system efficiency and battery range.

The work will preferably be conducted at BorgWarner in Landskrona and is suitable for 1-2 persons.

Reporting

The master thesis shall be reported as a written report, a simulation model, and an oral presentation at BorgWarner.

Contact Person

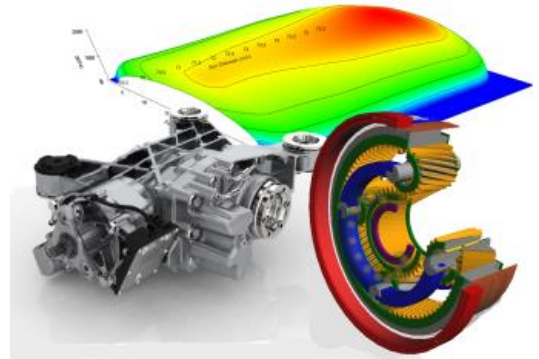
Kristoffer Nilsson
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Evaluation of an integrated oil/water heat-exchanger compared to an external proprietary alternative using simulation

Background

Energy efficiency and CO₂ reduction are two of the main focus areas when we develop the driveline systems for the future. Important elements in reaching the targets of CO₂ reduction are hybridization and electrification of vehicles. BorgWarner currently manufactures EV transmissions for both hybrid and electrical vehicles and we are continuously evaluating new technologies for our future products.



Challenge

- Develop a simulation model (CFD) of a cooling system for an electric drive.
- Using model, compare the effectiveness of an external and internal/integrated oil/water heat exchanger used for electric machine cooling.

The work will preferably be conducted at BorgWarner in Landskrona and is suitable for 1-2 persons.

Reporting

The master thesis shall be reported as a written report, a simulation model, and an oral presentation at BorgWarner.

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