3.2 Problem Two - Ride Optimisation Considering Vehicle Mass Property Variation

Presenting Institution: Jaguar Land Rover

Problem Presenter: Jacqui Morison, Pete Newbury (Andy Richardson, Steve Robinson, Claire Freeman)

Abstract (Technical Topics and Desired Outcomes):
Background: At Jaguar Land Rover the ultimate objective of the Vehicle Dynamics Team is for the vehicle to be 'signed off' by the Vehicle Evaluation Team as meeting customer requirements for Ride, Steering & Handling character in line with the brand DNA. Due to the cost of prototypes the sign-off process has its limitations in that it is focussed on a discrete number of vehicle variants. It does not fully consider the performance variability that exists across the full range of variants and/or specification levels. Each individual vehicle will have different mass and inertia properties affecting the ride performance. Therefore it is currently difficult to optimise the ride performance of the vehicle across the entire variant/specification range of a vehicle programme.

Objectives: To optimise the ride performance of the vehicle to achieve the ride targets for the programme, within programme assumptions.

UQ&M Aspirations: Since it is not understood how the variation in mass properties affect the distribution of ride from vehicle to vehicle and because only a discrete number of prototypes are available for tuning, current ride tuning does not fully optimise all possible variants/specifications.

- Determine a process to optimise vehicle ride performance for all potential customer vehicle variants & option specifications. Improved prediction of ride variation to minimise the number of component variables required to achieve desired ride performance across the programme.

- Is there a better method to optimise ride performance across a range of uncertain mass properties?

Resources Available for this Problem:

- Simulation experts from JLR

- Response surfaces relating input parameters to outputs of interest as proxy for full multi-body model

- Input, output distributions and sales data for real vehicle variant class.

- Data formats in `.xls` format

References:

1. Full problem details can be found here: Ride Optimisation Considering Vehicle Mass Property Variation. A presentation will be given on the first morning of the Study Group.

2. Presentation on use case, given 30th June 2015: Ride Optimisation Considering Vehicle Mass Property Variation

UQ&M Special Interest Group Study Group Information