



## LOTUS SUSPENSION ANALYSIS - RAVEN

Lotus Suspension Analysis provides a simple to use tool for both vehicle dynamics simulation (RAVEN) and the design of suspension geometry (SHARK).

A vehicle's dynamic behaviour is determined by its basic dimensions, its mass and inertia, and the kinematic and compliant wheel motion characteristics produced by its suspension. Desirable suspension characteristics may be achieved by many different suspension designs.

### ANALYSIS MODULES

RAVEN optimises the vehicle dynamic behaviour, through direct manipulation of the suspension characteristics. The suspension can then be designed to achieve these characteristics.

### SUSPENSION CHARACTERISTICS

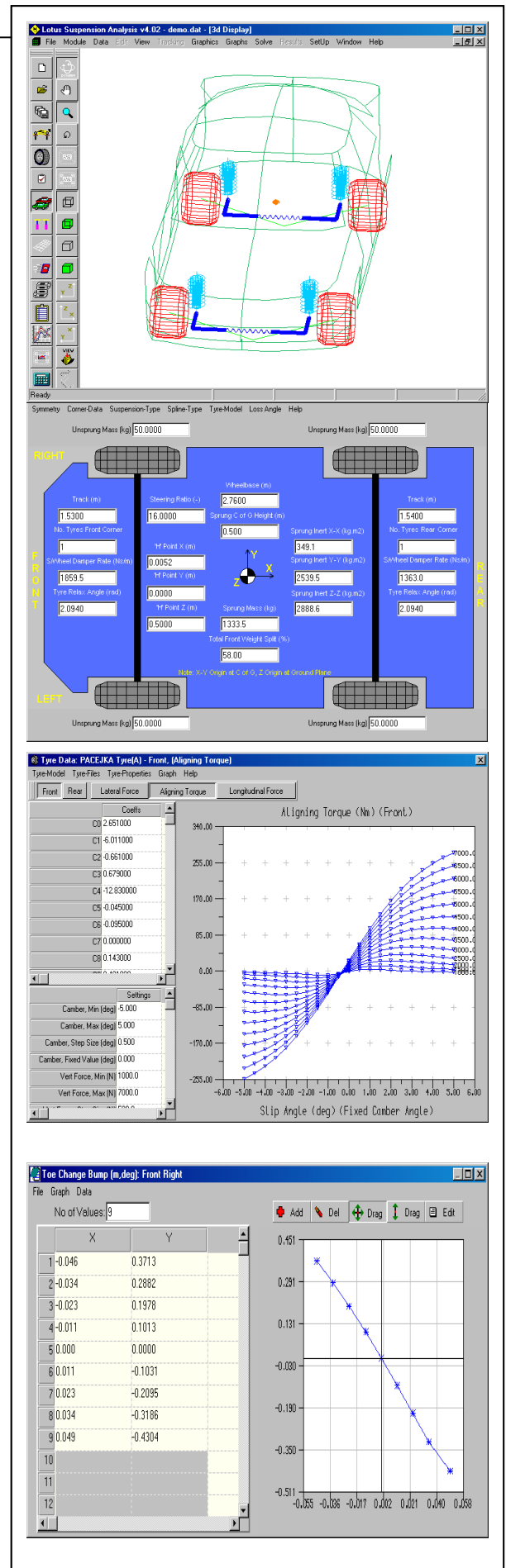
RAVEN uses a comprehensive non-linear vehicle model, derived from the kinematic and compliant wheel motion characteristics of a vehicle's suspension. The suspension characteristics used in the model can be imported from vehicle rig testing, concept coefficients, the SHARK suspension design module or alternative sub-system modelling.

### SOLVER MAPPING

RAVEN utilises a comprehensive mapping of the vehicle suspension characteristics as a function of applied wheel loading. This non-linear mapping allows the model to calculate a complete description of the wheel position and attitude during any dynamic event, and to apply the correct loading to the vehicle body. The solver currently uses Msc/ADAMS® to analyse the defined model.

### SPLINE EDITING

All spline based model parameters can be viewed and modified, with non-linear characteristics editable via direct data entry, definition by mathematical formula or by on-screen manipulation of points through X-Y plots.



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## TYRE PROPERTIES

A tyre characteristic viewer allows the user to select the desired tyre model and parameter file, and then visualise the tyre force characteristics via surface plots. Standard tyre models such as Pacejka, Delft and Adams carpet plots are supported.

## MANOEUVRE DEFINITION

A manoeuvre definition screen enables a variety of events to be easily configured, including steering, braking driveline and road inputs to be specified and combined as desired.

## POST PROCESSING

Dynamic response results are automatically displayed upon completion of a simulation. The interface allows the user to configure simultaneous displays of both 3D vehicle animation and the desired vehicle response time history graphs. A moving time bar on each graph is synchronised with the vehicle animation.

## RESPONSE PLOTTING

The models structure means that time histories for individual suspension characteristics may be plotted for each manoeuvre. This enables easy identification of characteristic's contribution to particular vehicle responses. In particular, compliant and kinematic effects may be separately displayed, more easily than with a linkage based model.

