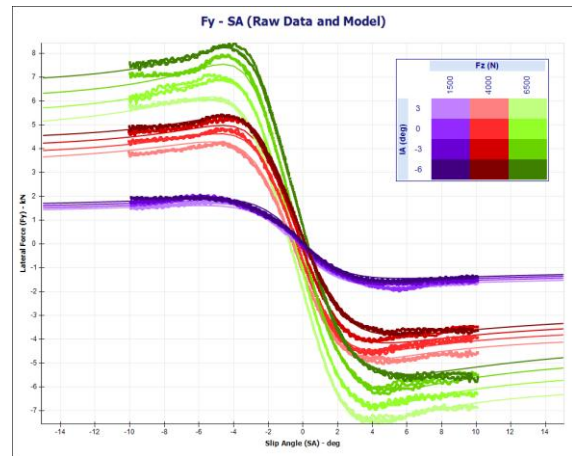


OptimumT Product Description

OptimumT is a convenient and intuitive software package that allows users to perform advanced tire data analysis, visualization, and model fitting. The model fitting procedure is very fast and efficient partially due to the data processing tools incorporated into the software.

All aspects of the tire models can be easily compared to the raw tire data to ensure accuracy. OptimumT also allows adjustment of the tire models if necessary and includes scaling factors. These features ensure that the tire models created will accurately correlate to data collected from the road or race track. These tire models, as well as the processed data, can be exported from OptimumT to a variety of file formats.



OptimumT is also a very powerful data visualization tool. It has the capability to display tire models and raw tire data in a user friendly yet extremely powerful graphing utility. It features 2D and 3D graphing of over 50 different tire parameters. The graphs can be further enhanced by including the effect of many different parameters including vertical load, inclination angle, and inflation pressure. These graphs can be easily copied or directly printed from the OptimumT interface to be included in other projects or reports.

Key Features:

- Import data from any source in any coordinate system and units
- Fit tire models to raw data
- Display tire data and models in 2D & 3D visualizations
- Create custom graphs or use predefined templates
- Export models for vehicle dynamic simulations
- Automated tire analysis reports

OptimumT Benefits:

- OptimumT is the most powerful and versatile tool for working with tire data and tire models
- The intuitive user interface makes any task quick, precise and efficient
- OptimumT can easily be integrated to work with most data sources and simulation tools
- Training and support by OptimumG's experienced engineers is included in the license
- OptimumT allows users to extract critical tire information to improve tire and vehicle design and performance in both research, development, testing and manufacturing areas
- OptimumT is being used by leaders in the industry, such as: *Goodyear, Bridgestone-Firestone, Dunlop* and many more...
- OptimumT is being used by universities such as: *MIT, Virginia Tech, Technical University of Munich, University of Birmingham* and many more...

Tire data import and pre-processing:

- Flexible import: Easily import tire data from CSV/ASCII files using the import wizard
- OptimumT supports all tire coordinate systems (*see Units and Coordinate Systems*)
- OptimumT supports most units (*see Units and Coordinate Systems*)
- Powerful pre-processing tools, enables efficient preparation of tire data
 - Data cropping (manual or automatic)
 - Data collapsing (multiple algorithms) to remove noise and test hysteresis
 - Automatic test case identification
- OptimumT supports data from both laboratory testing and road testing.

Tire modeling:

- OptimumT supports a wide-range of tire models, both physical and semi-empirical:
 - Pacejka Magic Formula '96, 2002 and 2006
 - MF5.2
 - Fiala
 - Harty
 - Brush
 - Custom models (program your own models into OptimumT, requires license upgrade)
- Multi-core optimized fitting process
- Multiple error evaluation methods
- Custom fitting weight factors
- Coefficient boundaries (pre-defined, automatic or manual)

Visualization and post-processing:

- Understand the tire using any of the more than 50 calculated tire parameters (*see Outputs*)
- Create 2D or 3D graphs using any combination of variables
- The efficient graphing engine can handle very large data sets (>500 000 data points)
- Graph templates helps make the graphing procedure very quick and easy
- Customize the appearance of the graph to highlight important aspects of model and data
- Export graphs and graph data to reports and presentations.

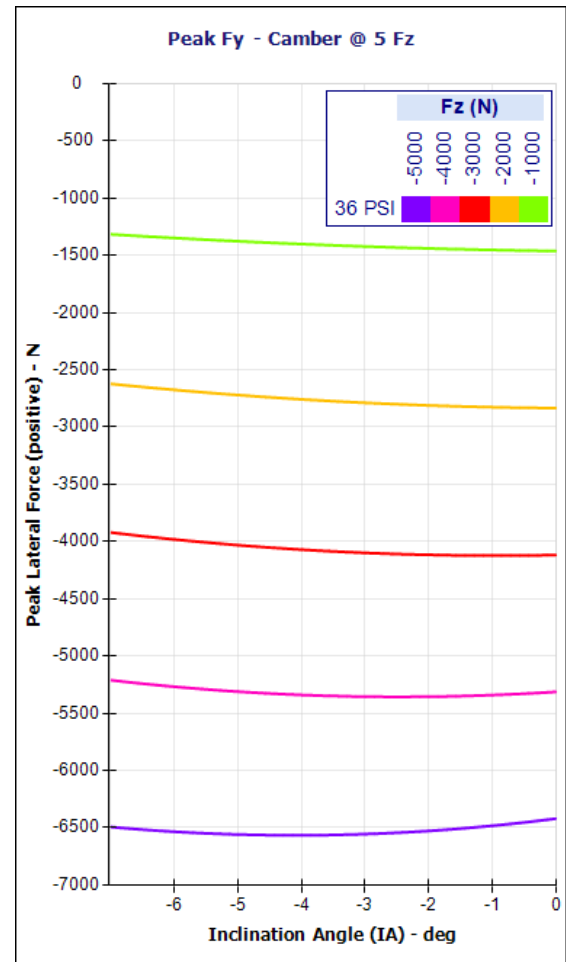
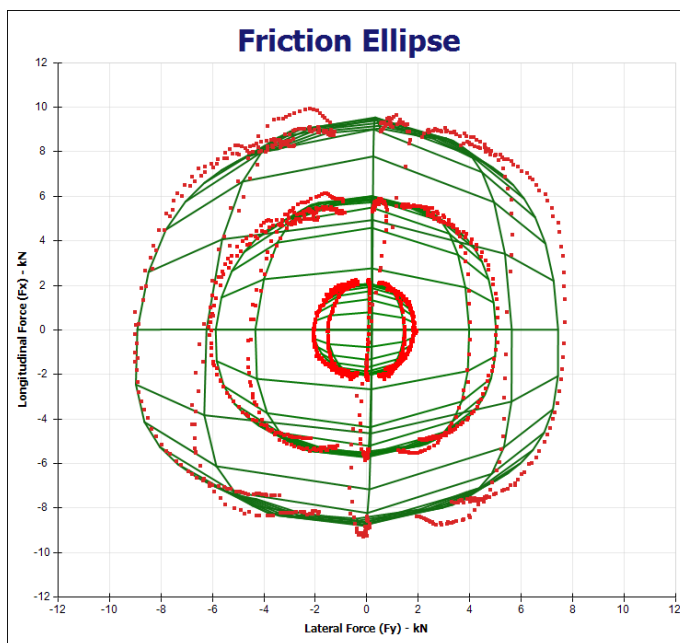
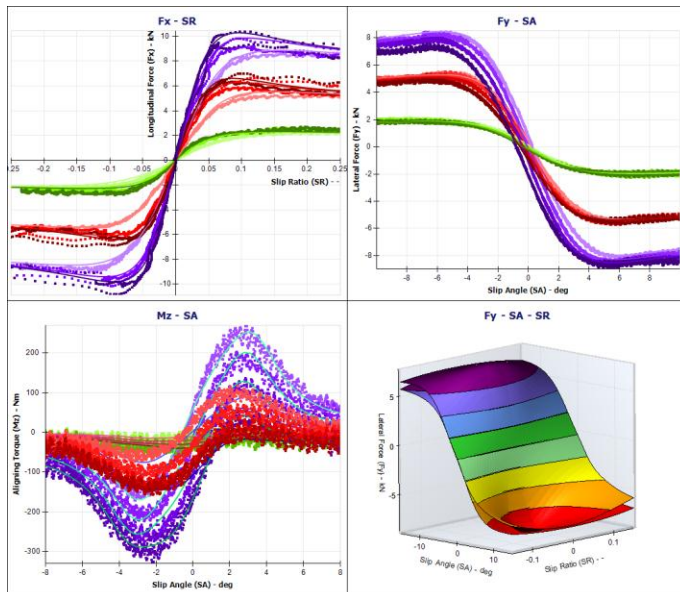
Tire Model Analysis and Model Export:

- Connect OptimumT to other software tools such as MATLAB and Excel
 - Integrate OptimumT calculations into your own spreadsheets and simulation codes
 - Automatically create standardized reports of tire characteristics
- Export tire models to most commercially available vehicle simulation software such as:
 - ADAMS, CarSim, SimPack, IPG CarMaker, veDyna, MATLAB/Simulink etc.
- Create custom export formats for efficient data transfer in any scenario

About OptimumG:

OptimumG is a company specialized in vehicle dynamics solutions. OptimumG helps clients enhance their understanding of vehicle dynamics through consulting, training and software development. OptimumG has years of experience ranging from commercial vehicles to race cars. Our engineers have worked with Dunlop, Goodyear, Bridgestone-Firestone, Audi, Ferrari, Peugeot, Toyota, Ford, BMW and ZF Sachs, to name a few.

Sample Graphs:



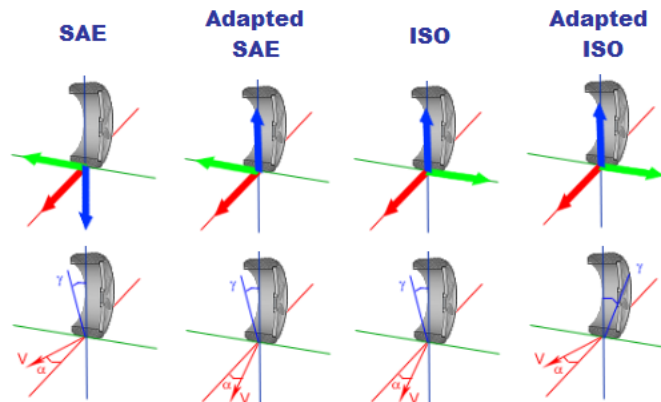
Units and Coordinate Systems:

Units in OptimumT				
Unit Type	Angle	Force	Force / Angle	Force/Ratio
Units	degree	Newton	Newton/Degree	Newton
	radian	kilonewton	Newton / radian	Newton / percent
		kilogram-force	kilonewton / degree	kilonewton
		pound	kilonewton / radian	kilonewton / percent
			kilogram-force / degree	kilogram-force
			kilogram-force / radian	kilogram-force / percent
			pound / degree	pound
		pound / radian	pound / percent	

Units in OptimumT				
Unit Type	length	Moment	Pressure	Ratio
Units	meter	Newton meter	bar	Unit-less
	centimeter	Newton millimeter	Pascal	percent
	millimeter	kilonewton meter	kilopascal	
	foot	kilogram-force meter	pound / square inch	
	mile	foot pound		
		inch pound		

Units in OptimumT			
Unit Type	Stiffness	Time	Velocity
Units	Newton / meter	second	meter / second
	Newton / millimeter	hour	kilometer / hour
	kilonewton / meter		feet / second
	kilonewton / millimeter		mile / hour
	kilogram-force / meter		
	kilogram-force / millimeter		
	pound / foot		
pound / inch			

Coordinate Systems



Outputs:

Basic	Unit Type
Inclination Angle (IA)	angle
Slip Angle (SA)	angle
Slip Ratio (SR)	ratio
Speed (V)	velocity
Pressure (P)	pressure
Loaded Radius (RL)	length

Force / Moment	Unit Type
Longitudinal Force (Fx)	force
Lateral Force (Fy)	force
Normal Load (Fz)	force
Overturning Moment (Mx)	moment
Rolling Resistance (My)	moment
Aligning Torque (Mz)	moment

Derivatives	Unit Type
Cornering Stiffness	force / angle
Inst. Cornering Stiffness	force / ratio
Slip Stiffness	force / angle
Inst. Slip Stiffness	force / ratio
Camber Stiffness	force / angle
Inst. Camber Stiffness	force / angle
Lateral Load Sensitivity	ratio
Longitudinal Load Sensitivity	ratio
Aligning Moment Load Sensitivity	length
Overturning Moment Load Sensitivity	length
Rolling Resistance Load Sensitivity	length

Coefficient of Friction	Unit Type
Lateral Coefficient of Friction	ratio
Longitudinal Coefficient of Friction	ratio

Normalized	Unit Type
Normalized Longitudinal Force	ratio
Normalized Lateral Force	ratio
Normalized Inst. Cornering Stiffness	1 / angle
Normalized Inst. Slip Stiffness	ratio
Normalized Inst. Camber Stiffness	1 / angle
Cornering Stiffness Coefficient	1 / angle
Slip Stiffness Coefficient	ratio
Camber Stiffness Coefficient	1 / angle

Moment Arm	Unit Type
Pneumatic Trail	length
Pneumatic Scrub Radius	length

Peak	Unit Type
Slip Angle at Peak Fy (negative)	angle
Slip Angle at Peak Fy (positive)	angle
Slip Ratio at Peak Fx (negative)	ratio
Slip Ratio at Peak Fx (positive)	ratio
Peak Lateral Force (negative)	force
Peak Lateral Force (positive)	force
Peak Longitudinal Force (negative)	force
Peak Longitudinal Force (positive)	force
Offset x	force
Fx Offset (Fx @ SR = 0)	force
Fy Offset (Fy @ SA = 0)	force