

Curve Operations

Curve Operations

T/HIS contains over 80 functions for manipulating curve data.

Functions are divided into 4 main categories: Operate, Maths, Automotive and Seismic.

The T/HIS Manual explains the functions in more detail.

You can hover over a button for a description (whether it is selected or not).

The screenshot shows the T/HIS software interface. At the top, there is a 'Page Nu' field with navigation arrows and a 'Primer' button. Below this is a grid of menu items: Read, Write, Curves, Models, Edit, Style, Properties, Images, Operate, Maths, Automotive, Seismic, Macros, FAST-TCF, Title/Axes, Display, Settings, Measure, Groups, Graphs, Command, Units, JavaScript, Datum. The 'Operate' button is highlighted with a red border. Below the main menu is a search bar with a magnifying glass icon, 'All', 'G1', and 'None' buttons. At the bottom, a sub-menu titled 'Operate' is open, showing a grid of function buttons: ABS, ADD (y), ADD (x), AVE, CAT, CLIP, COM, DIF, DIV (y), DIV (x), ENV, ERR, INT, LSQ, MAP, MAX, MIN, MON, MUL (y), MUL (x), NOR (y), NOR (x), ORDER, REC, Multiply Y, EV, R-AVE, SMO, SQR, STRES, SUB (y), SUB (x), SUM, TRA, VEC, VEC(2D), WINDO, ZERO, dB, dBA, Octave. The 'Multiply Y' button is highlighted with a white tooltip.

—	Read	Write	Curves	Models
Edit	Style	Properties	Images	
Operate	Maths	Automotive	Seismic	
Macros	FAST-TCF	Title/Axes	Display	
Settings	Measure	Groups	Graphs	
Command	Units	JavaScript	Datum	

<< Undock		Operate				?	X
ABS	ADD (y)	ADD (x)	AVE	CAT	CLIP		
COM	DIF	DIV (y)	DIV (x)	ENV	ERR		
INT	LSQ	MAP	MAX	MIN	MON		
MUL (y)	MUL (x)	NOR (y)	NOR (x)	ORDER	REC		
Multiply Y	EV	R-AVE	SMO	SQR	STRES		
SUB (y)	SUB (x)	SUM	TRA	VEC	VEC(2D)		
WINDO	ZERO	dB	dBA	Octave			


Operate

- The Operate menu contains a number of general functions.
- Basic functions include adding, subtracting, multiplying and dividing curves by either constants or other curves. Other options include integration, differentiation and normalisation.
- More advanced functions include the vector magnitude of 2 or 3 components, summation of multiple curves and the minimum/maximum of multiple curves.



Page Nu  1 

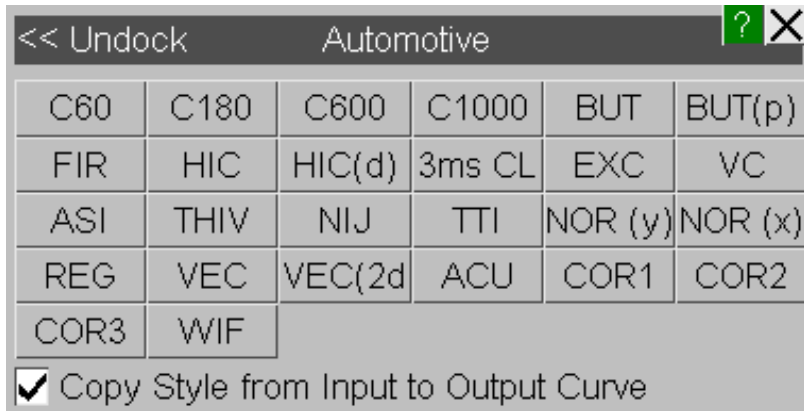
—	Read	Write	Curves	Models
Edit	Style	Properties	Images	
Operate	Maths	Automotive	Seismic	
Macros	FAST-TCF	Title/Axes	Display	
Settings	Measure	Groups	Graphs	
Command	Units	JavaScript	Datum	

 **All** **G1**
None

<< Undock Operate  

ABS	ADD (y)	ADD (x)	AVE	CAT	CLIP
COM	DIF	DIV (y)	DIV (x)	ENV	ERR
INT	LSQ	MAP	MAX	MIN	MON
MUL (y)	MUL (x)	NOR (y)	NOR (x)	ORDER	REC
RES	REV	R-AVE	SMO	SQR	STRES
SUB (y)	SUB (x)	SUM	TRA	VEC	VEC(2D)
WINDO	ZERO	dB	dBa	Octave	

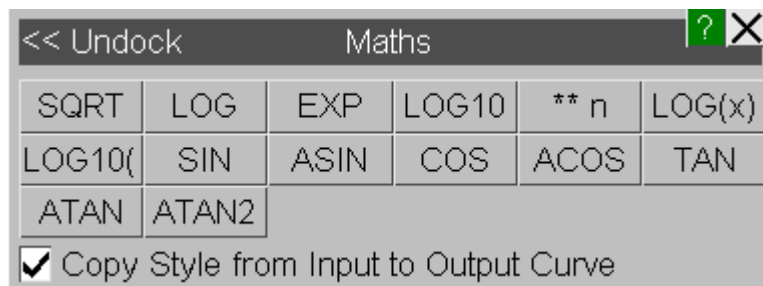
Automotive (filtering)



<< Undock		Automotive				?	X
C60	C180	C600	C1000	BUT	BUT(p)		
FIR	HIC	HIC(d)	3ms CL	EXC	VC		
ASI	THIV	NIJ	TTI	NOR (y)	NOR (x)		
REG	VEC	VEC(2d)	ACU	COR1	COR2		
COR3	WIF						
<input checked="" type="checkbox"/> Copy Style from Input to Output Curve							

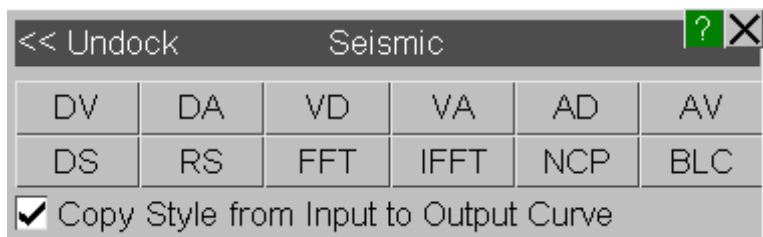
The Automotive menu contains a number of industry standard filtering options and injury criteria.

- SAE C60, C180, C600, C1000 filters
- Butterworth and FIR filters
- Head Injury Criteria (HIC)
- 3ms Clip
- Viscous Criteria
- Theoretical Head Impact Velocity
- Neck Injury Criteria
- Thoracic Trauma Index



The Maths menu contains a number of standard mathematical functions:

Square Root, Log, Ln, Exponential, SIN, COS, TAN, ASIN, ACOS, ATAN.



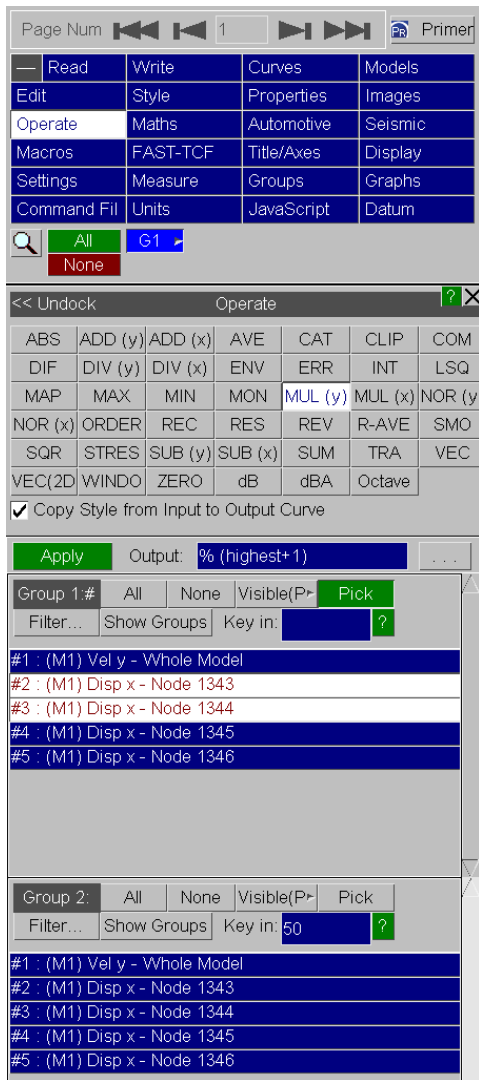
The Seismic menu can be used to handle response spectra information. In particular, displacement, velocity or acceleration spectra can be read and converted to another format.

One curve input



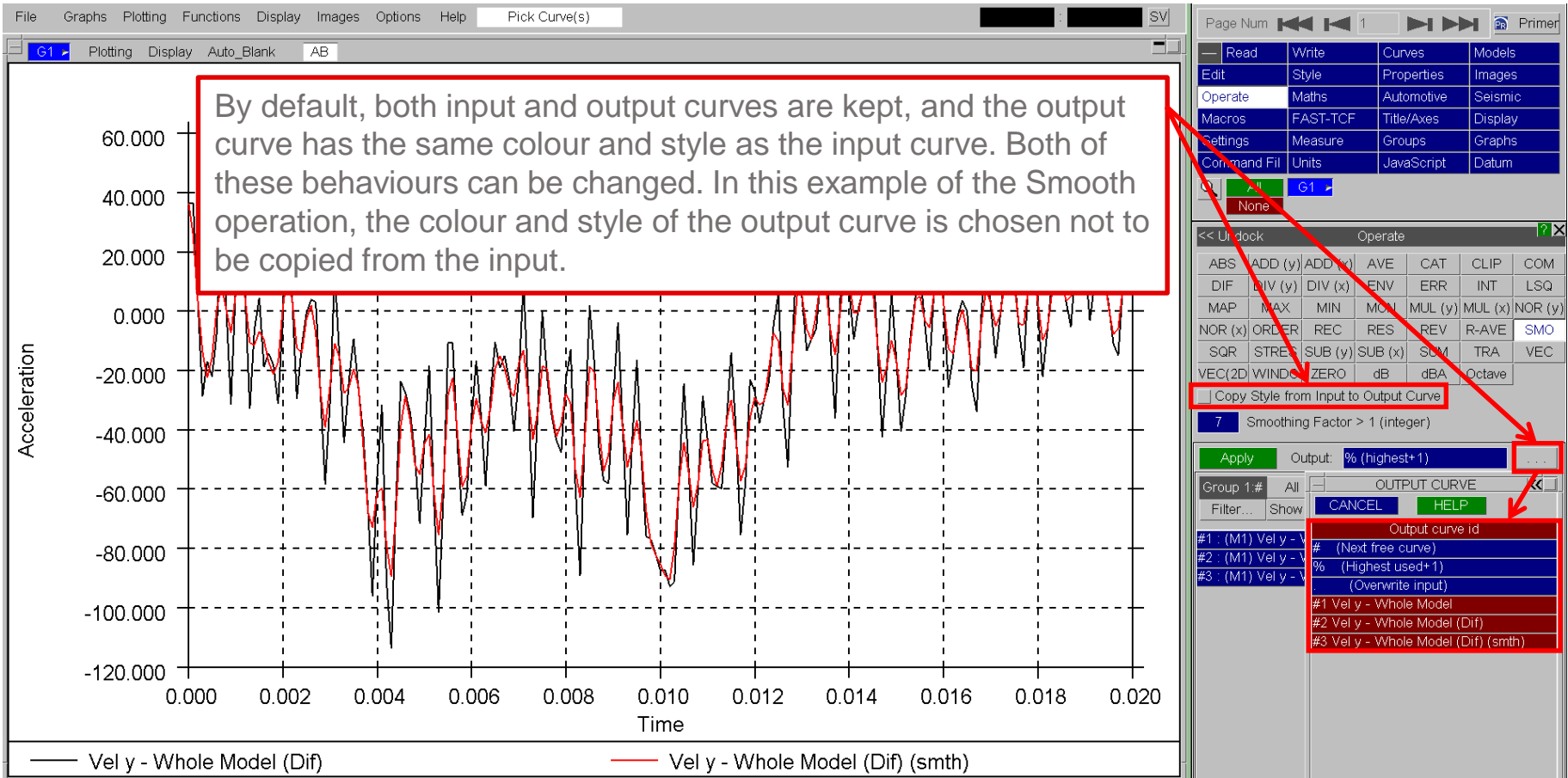
- Operations requiring one curve input (e.g. ABS, CLIP, DIF, ...)
 - Click on the curves in the list; alternatively, left click on the desired curve on the plot.
 - If the operation requires constants, these are typed in the blue text boxes (e.g. X minimum value)
 - One output curve is produced from each input curve.

Two curve input



- Operations requiring two inputs (e.g. MUL)
 - A (“Group 1”) can be
 - One curve: Select one curve in the usual way.
 - Many curves: Select **N** curves in the usual way.
 - B (“Group 2”) can be
 - Constant: key in the value. *Each curve in Group 1 will be multiplied by the constant, producing **N** output curves.*
 - One curve: select the curve in the usual way. *Each curve in Group 1 will be multiplied by this curve (the y-values at each x-point are multiplied together), producing **N** output curves.*
 - **N** curves: select the curves in the usual way. *The first curve in A is multiplied by the first curve in B, the second by the second, etc, resulting in **N** output curves.*

Output curves



Quick-Pick

File Graphs Plotting Functions Display Images Options Help **Pick Curve(s)** 0.008339 SV

Plotting Display Auto_Blank AB

Displacement

Time

When an operation is selected, the quick-pick option automatically changes to 'Pick Curve(s)', allowing the input curve(s) to be selected by Left-Clicking on them in the graph. Curves are then highlighted as they are picked.

— Disp x - Node 1343
— Disp x - Node 1344
— Disp x - Node 1345
— Disp x - Node 1346

Dialogue: (Written [Disp x - Node 1344] to curve #5)
(Written [Disp x - Node 1345] to curve #6)
(Written [Disp x - Node 1346] to curve #7)
Selected Curve: 4 - Disp x - Node 1343

Global Commands: Plot, Zoom, Manual, Point, Autoscale, Stop, Clear, Centre, Tidy

Page Num 1 Primer

—	Read	Write	Curves	Models
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Command Fil	Units	JavaScript	Datum	

Apply Output: % (highest+1)

Group 1 #	All	None	Visible(P)	Pick
Filter...	Show Groups	Key in:		?
#1	(M1) Vel y - Whole Model			
#2	(M1) Vel y - Whole Model (Dif)			
#3	(M1) Vel y - Whole Model (Dif) (smth)			
#4	(M1) Disp x - Node 1343			
#5	(M1) Disp x - Node 1344			
#6	(M1) Disp x - Node 1345			
#7	(M1) Disp x - Node 1346			

Group 2 #	All	None	Visible(P)	Pick
Filter...	Show Groups	Key in:		?
#1	(M1) Vel y - Whole Model			
#2	(M1) Vel y - Whole Model (Dif)			
#3	(M1) Vel y - Whole Model (Dif) (smth)			
#4	(M1) Disp x - Node 1343			
#5	(M1) Disp x - Node 1344			
#6	(M1) Disp x - Node 1345			
#7	(M1) Disp x - Node 1346			

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