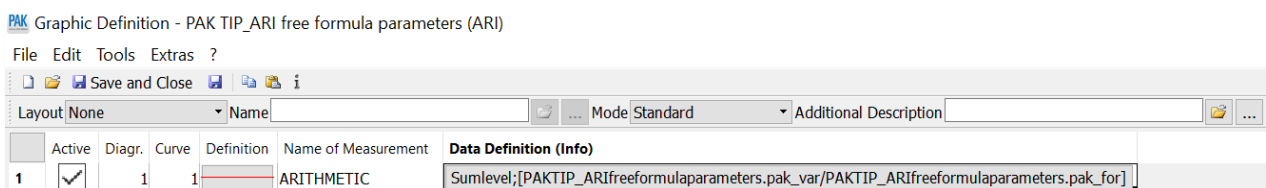
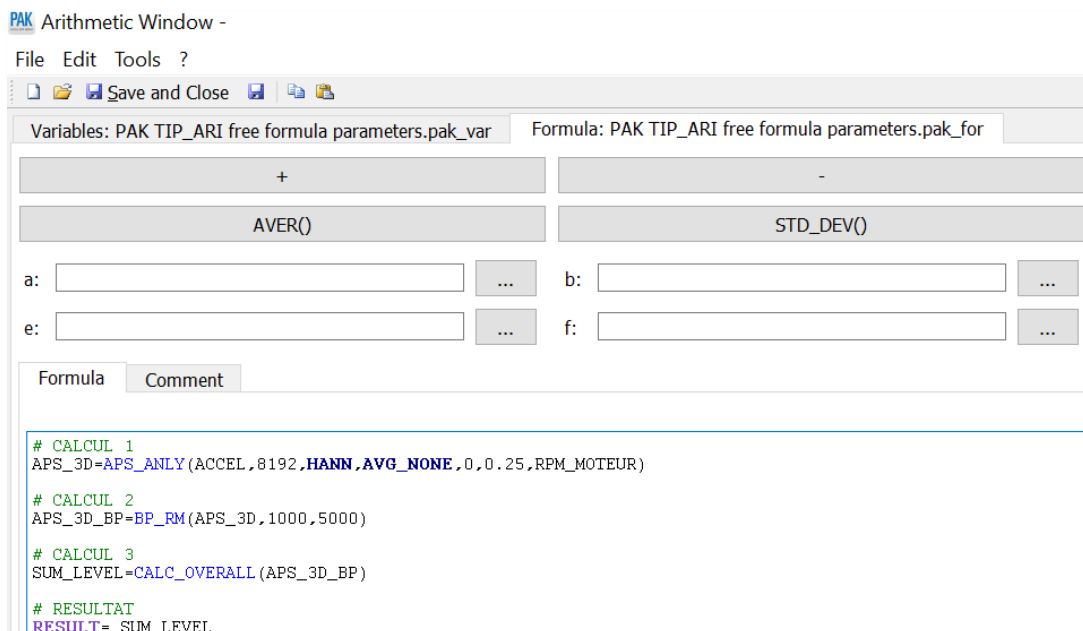
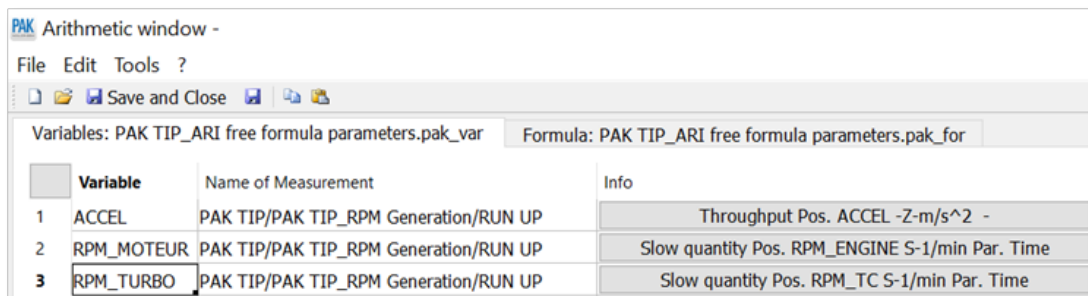


## PAK ARITHMETIC : FREE FORMULA PARAMETERS

The purpose of this PAK Tip is to present the "Free formula parameters" functionality of the Arithmetic module which allows you to vary parameters in a predefined way.

When calculating in the Arithmetic module, some functions require input parameters in the formulas used. In the following example, we start from the time recorded in the measurement to perform various calculations. The data contains the signal from an accelerometer and two rotational speeds :



**#CALCULATION 1**

We first calculate the 3D Autospectrum of the accelerometer's "Throughput", with a number of blocks of 8192, a Hanning window, no averaging, an Overlap of 25%, all depending on the speed channel engine.

**#CALCULATION 2**

Then we want to filter this APS\_3D in Band Pass, between 2 frequency terminals.

Note: the "BP\_RM" function performs a Band Pass Removal, the datasets outside the considered frequency range are removed.

**#CALCULATION 3**

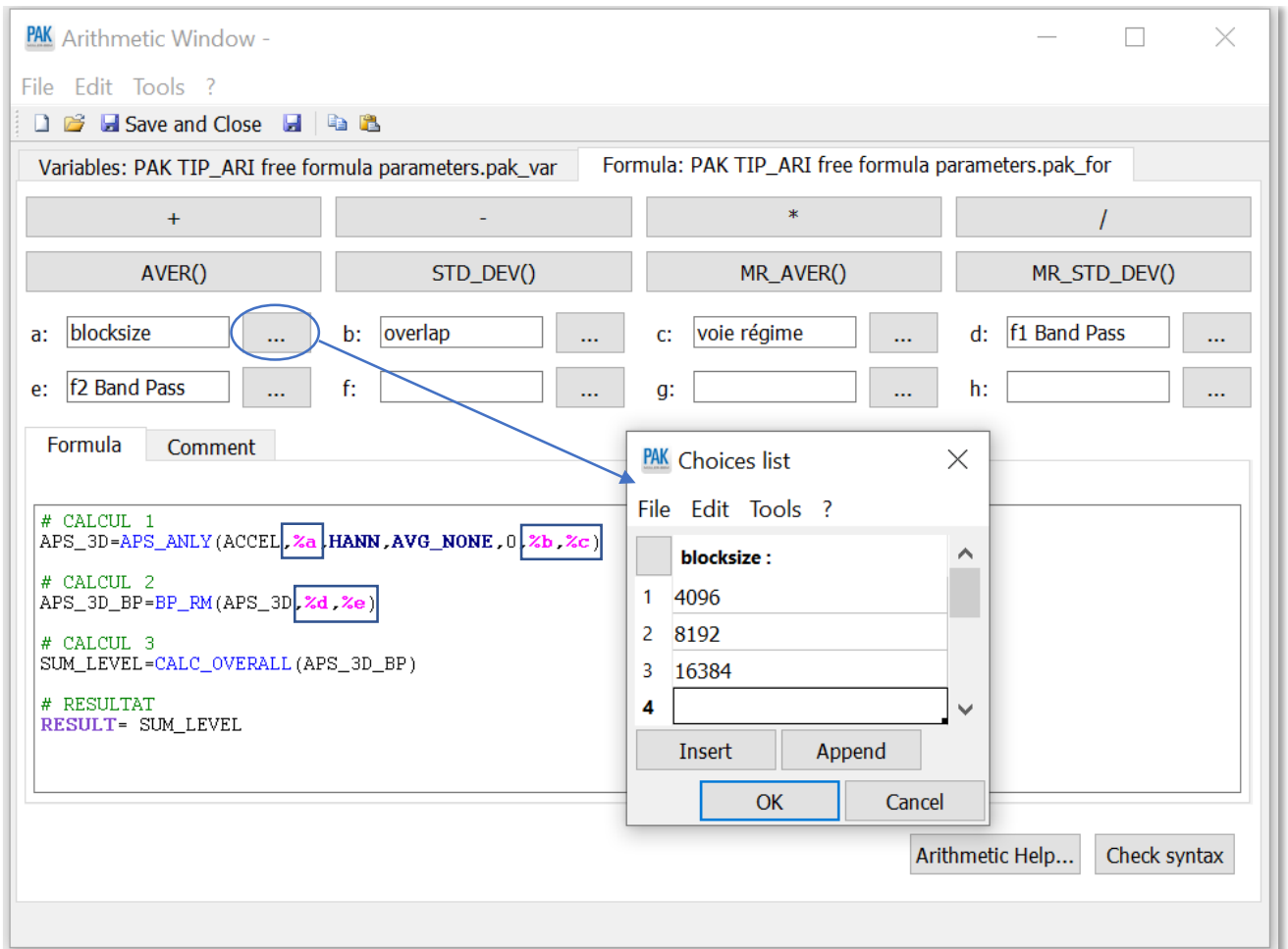
Finally, we calculate the overall level of this APS\_3D filtered Band Pass.

If we now want to vary these parameters (blocksize, overlap, speed channel, Band Pass frequency range), it seems necessary to create as many formulas as there are desired configurations and to have to recall each of these formulas ".pak\_for" in a new line of the "Graphic Definition".

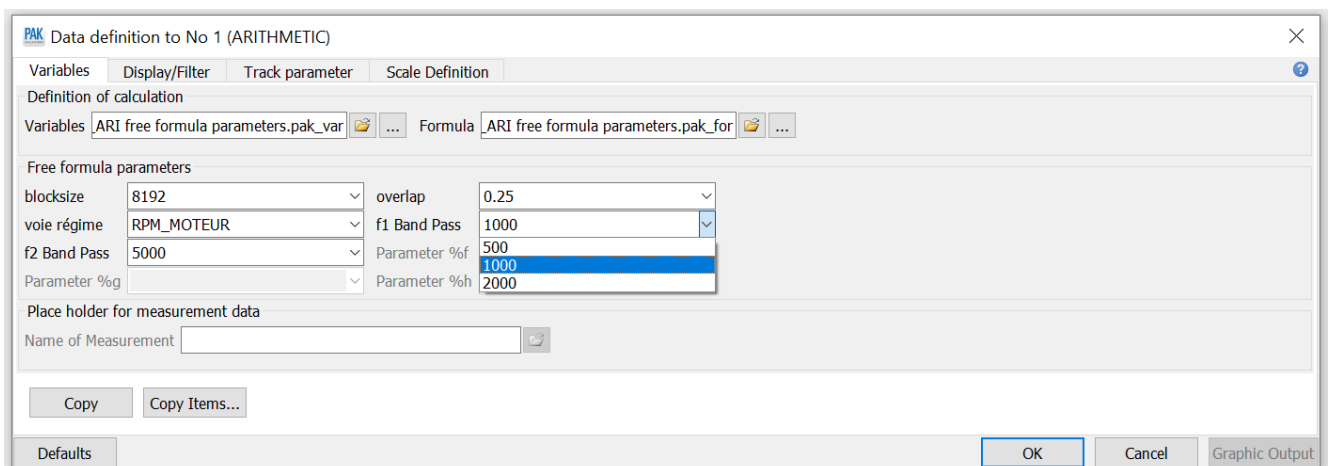
The "Free formula parameters" fields solve this difficulty: they allow you to select and vary up to 8 input parameters, using lists predefined by the user, without editing or duplicating the ".pak\_for" formula.

Each of the parameters is defined in one of the 8 fields "a, b, c, d, e, f, g, h" of the "Formula" window.

The list of values to be assigned to each parameter is edited and completed. It is also necessary to indicate in the formulas % a, % b, % c etc... so that the selected parameter is taken into account.



Once the lists are completed and the %x pointers indicated in the formulas, the lists appear in the "Data Definition" and are usable :



We can thus create several lines in the “Graphic Definition” and visualize the results of calculations for several predefined parameters in the lists :

PAK Graphic Definition - PAK TIP\_ARI free formula parameters (ARI)

File Edit Tools Extras ?

Save and Close

Layout None Name Mode Standard Additional Description

	Active	Diagr.	Curve	Definition	Name of Measurement	Data Definition (Info)
1	<input checked="" type="checkbox"/>	1	1	ARITHMETIC		Sumlevel;[PAKTIP_ARIfreeformulaparameters.pak_var/PAKTIP_ARIfreeformulaparameters.pak_for]
2	<input checked="" type="checkbox"/>	1	2	ARITHMETIC		Sumlevel;[PAKTIP_ARIfreeformulaparameters.pak_var/PAKTIP_ARIfreeformulaparameters.pak_for]

PAK Data definition to No 1 (ARITHMETIC)

Variables Display/Filter Track parameter Scale Definition Sum level

Definition of calculation

Variables ARI free formula parameters.pak\_var Formula ARI free formula parameters.pak\_for

Free formula parameters

blocksize	8192	overlap	0.25
voie régime	RPM_MOTEUR	f1 Band Pass	1000
f2 Band Pass	5000	Parameter %f	
Parameter %g		Parameter %h	

Place holder for measurement data

Name of Measurement

PAK Data definition to No 2 (ARITHMETIC)

Variables Display/Filter Track parameter Scale Definition Sum level

Definition of calculation

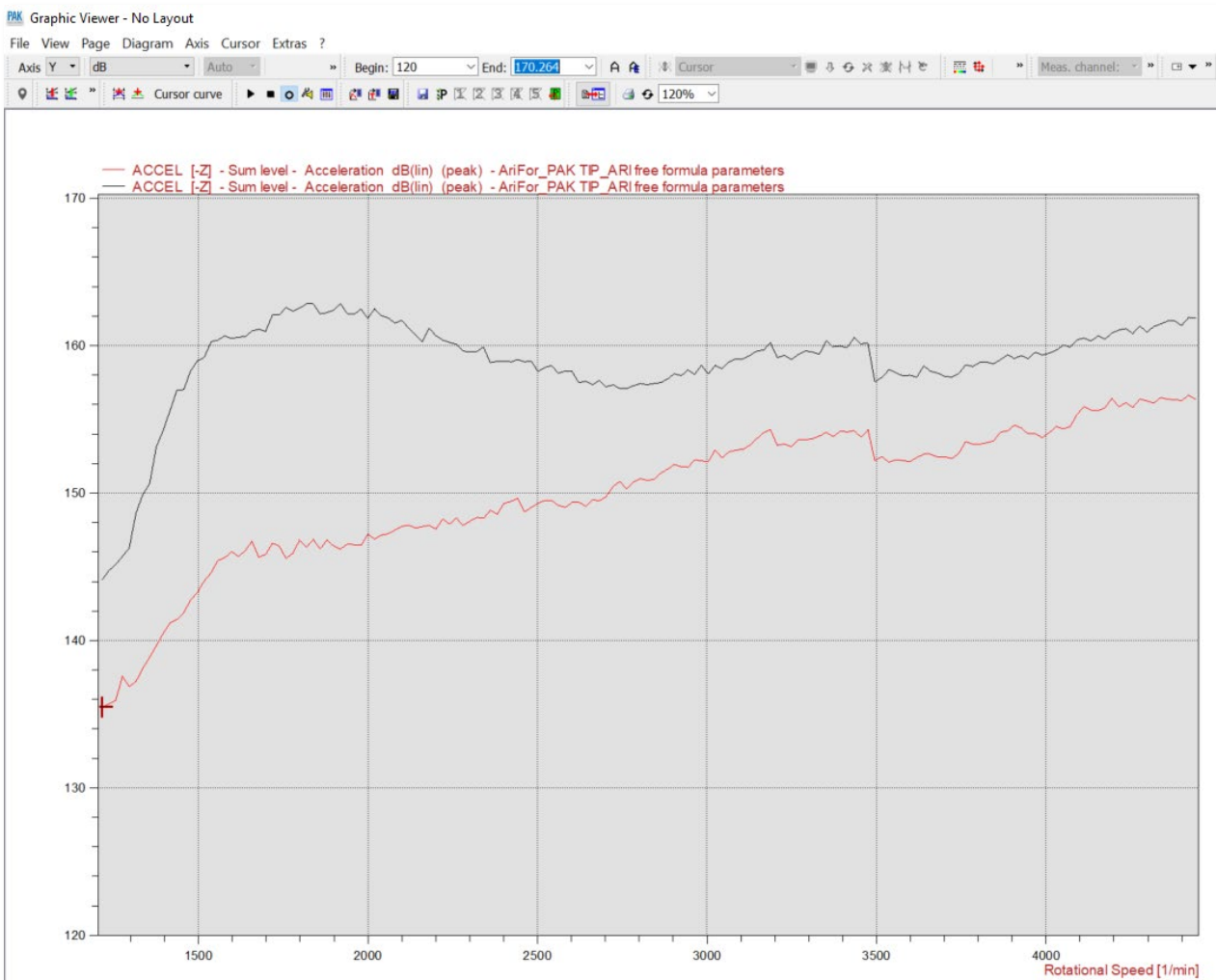
Variables ARI free formula parameters.pak\_var Formula ARI free formula parameters.pak\_for

Free formula parameters

blocksize	8192	overlap	0.25
voie régime	RPM_MOTEUR	f1 Band Pass	500
f2 Band Pass	15000	Parameter %f	
Parameter %g		Parameter %h	

Place holder for measurement data

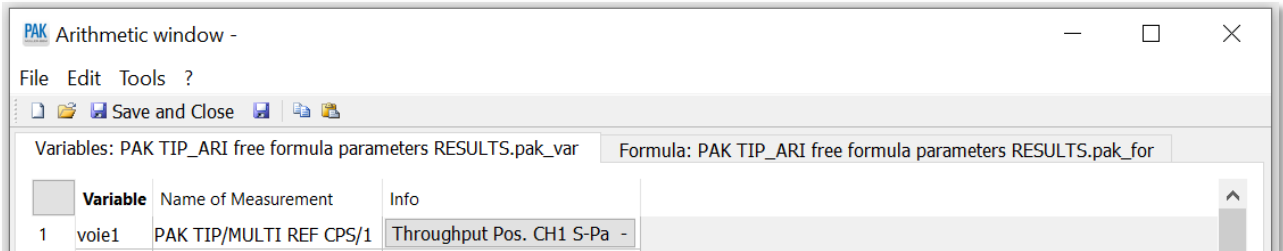
Name of Measurement



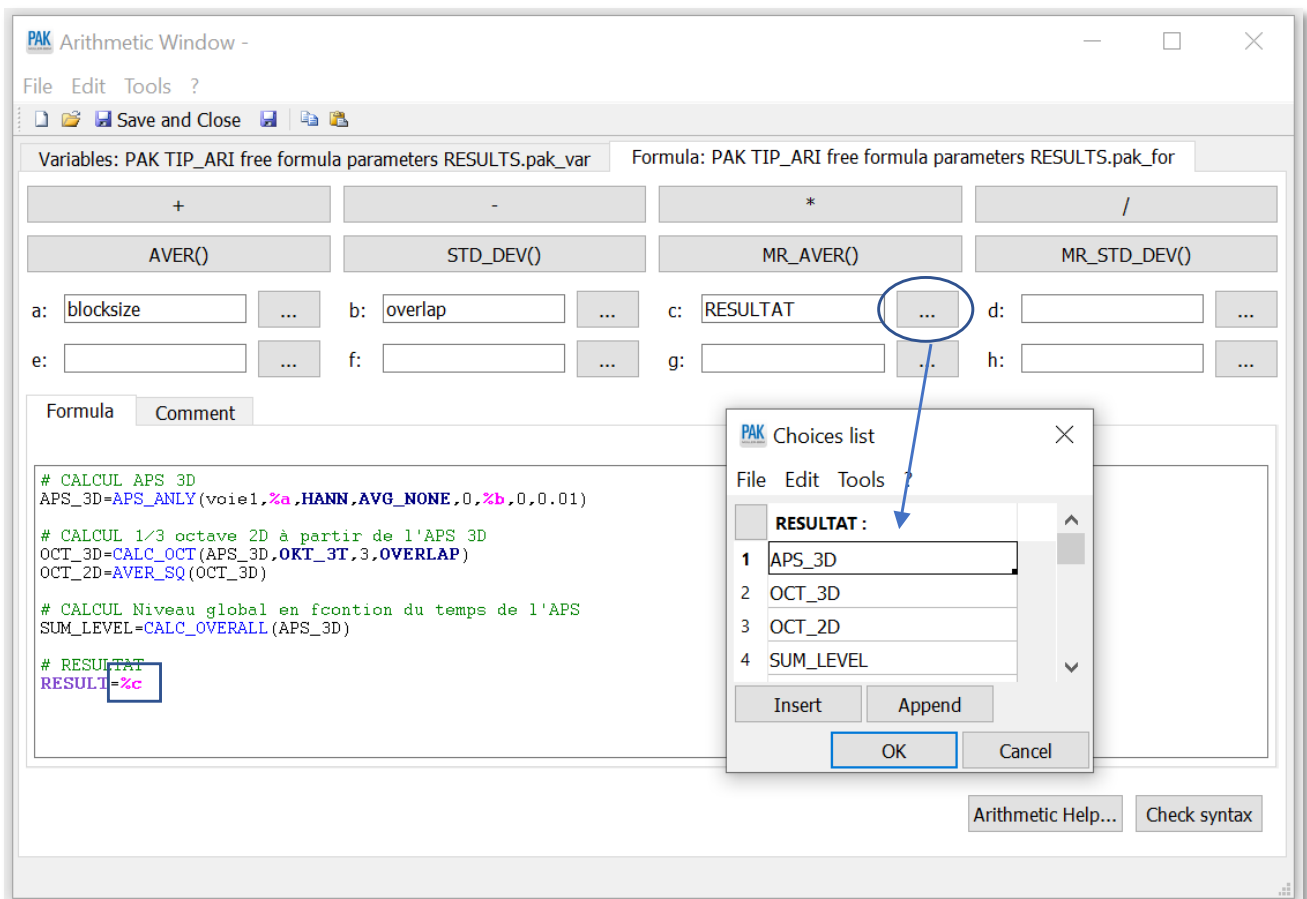
A specific layout can then be produced by recalling the graphic variables allowing access to the fields corresponding to the "Free formula parameters" (PAK Tip 18 of February 2010).

This method can also be used to achieve different end results.

This time, we start with the time of an acoustic pressure channel, recorded as a function of time :



We carry out various calculations (3D APS / third of an octave / global level) and we enter these variables in the "%c" list to which the final "RESULT" will point :



This makes it possible to have access to different final results for the same formula, and if necessary, to control the intermediate calculations.

## PREVIEW

What awaits you in September 2021 in your PAK Tip : « **PAK 6.0** ».

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