



# OXYGEN TRAINING

- > Formulas
- > Statistics
- > Filters





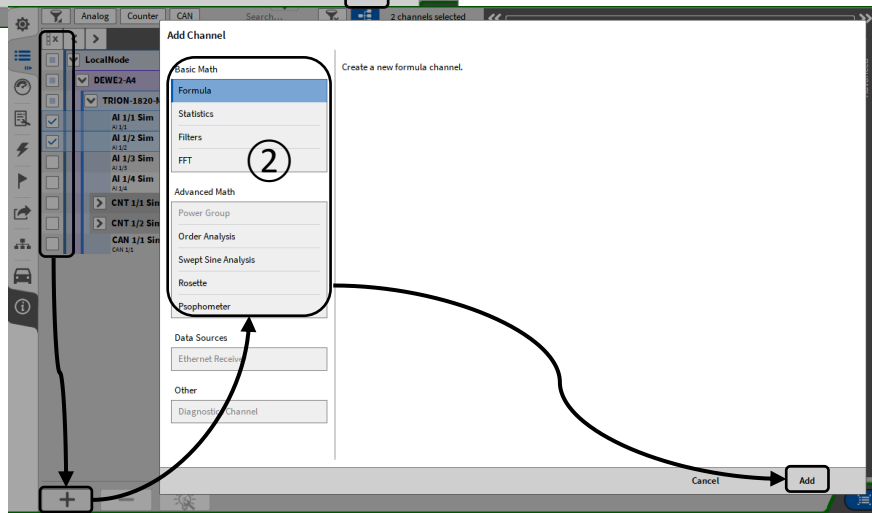
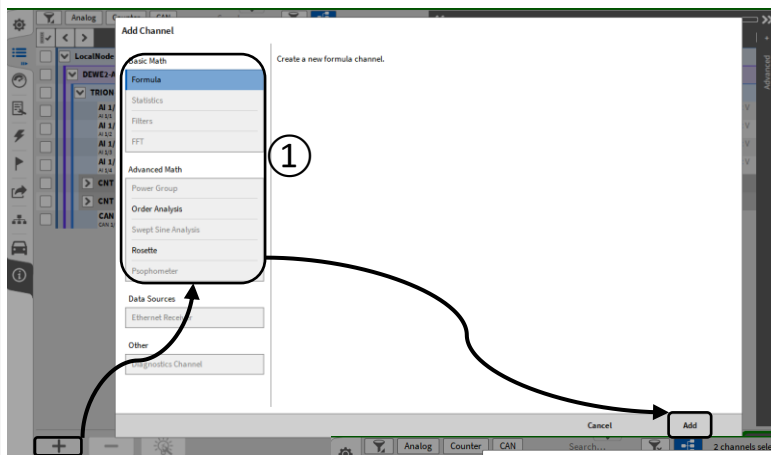
- > Adding Math Channels
- > Creating Formulas
  - > Standard Operations
  - > Trigonometric
  - > Logical
  - > Measurement
  - > Miscellaneous
  - > Creation of Reference Curves in Time Domain
  - > Array channel support for formulas
- > Creating Statistics
  - > Array channel support for statistics
- > Creating Filters
- > Offline Math



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# ADD MATH CALCULATIONS TO THE MEASUREMENT SETUP

- ① To create
  - > Formulas
  - > Order analysis modules
  - > Rosette calculationspress the + button  
Select the proper calculation and press *Add*
- ② Reference channels must be selected before creating
  - > Statistics
  - > Filters
  - > FFT
  - > Swept sine analysis
  - > Psophometers

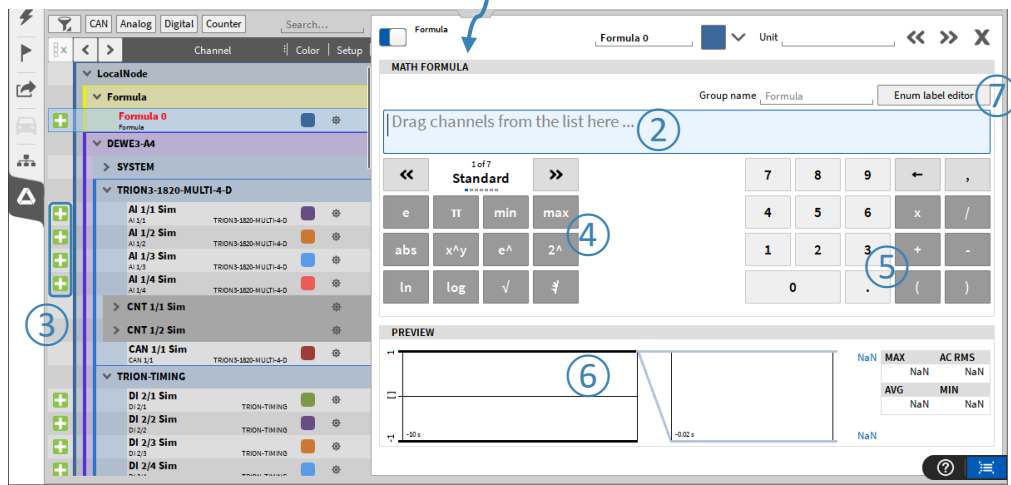
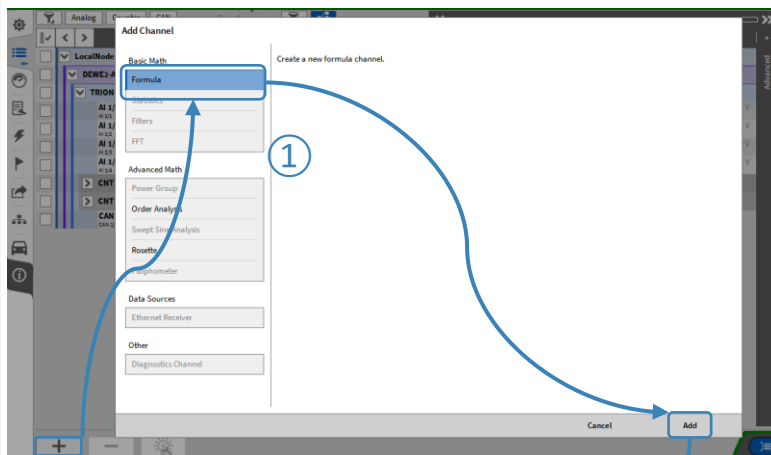




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# CREATING A FORMULA

- 1 Press the **+** button, select *Formula* and press *Add*  
Formula editor will open afterwards
- 2 Formula Input field
- 3 Press the **+** button to add a channel to the input field or use drag-and-drop
- 4 Selection of math functions
- 5 Numeric pad with basic mathematic operations
- 6 Preview of the formula output
- 7 Enum label editor  
Sets up text labels for specific values





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# SIMPLE EXAMPLES

① Multiplication of 2 signals

② Mean average of 3 signals

③  $2 \cdot \sin(2 \cdot \pi \cdot 1 \cdot \text{time})$

$+chx/x \cdot 0$  required to determine the correct time base

Channels can have different sample rates, thus OXYGEN needs one time reference in each formula

The image displays three screenshots of the DEWETRON software interface, illustrating the configuration of formulas for different operations. Each screenshot shows a 'LocalNode' tree on the left and a 'Formula' configuration panel on the right.

- Screenshot 1 (Top):** The 'Formula' panel is set to 'Multiplication'. The 'MATH FORMULA' field contains the expression  $'AI\ 1/1\ Sim' * 'AI\ 1/2\ Sim'$ , labeled with a circled 1. The 'Unit' is set to 'V'.
- Screenshot 2 (Middle):** The 'Formula' panel is set to 'Mean Average'. The 'MATH FORMULA' field contains the expression  $('AI\ 1/1\ Sim' + 'AI\ 1/2\ Sim' + 'AI\ 1/3\ Sim') / 3$ , labeled with a circled 2. The 'Unit' is set to 'V'.
- Screenshot 3 (Bottom):** The 'Formula' panel is set to 'Standard'. The 'MATH FORMULA' field contains the expression  $2 * \sin(2 * \pi * 1 * \text{time}) + 'AI\ 1/1\ Sim' * 0$ , labeled with a circled 3. The 'Unit' is set to 'V'. A black arrow points from the text in the blue box to the  $+ 'AI\ 1/1\ Sim' * 0$  part of the formula.

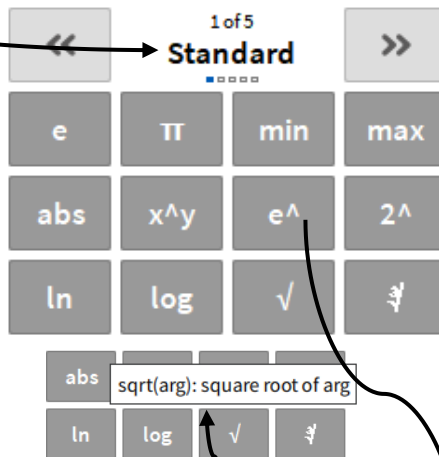


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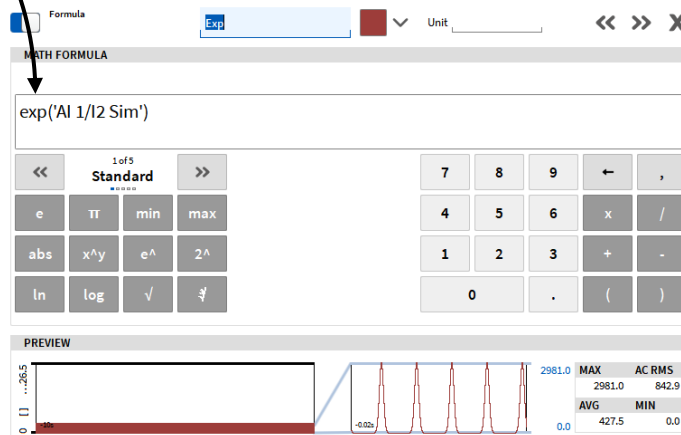
# MATHEMATICAL OPERATIONS – STANDARD OPERATIONS

- ① Standard operations
- ② Trigonometric operations
- ③ Logical operations
- ④ Measurement operations
- ⑤ Misc



*Tool tips pop up when the mouse remains on one operation*

Function	Description	Syntax
e	Euler's number	e
$\pi$	Constant Pi	pi
min	Minimum of two values	min(x,y)
max	Maximum of two values	max(x,y)
abs	Absolute value	abs(value)
$x^y$	Exponential function with arbitrary basis	pow(x,y)
$e^x$	Exponential function with basis e	exp(x)
$2^x$	Exponential function with basis 2	exp2(x)
ln	Natural logarithm to basis e	ln(x)
log	Common logarithm to basis 10	log(x)
$\sqrt{\phantom{x}}$	Square root	sqrt(x)
$\sqrt[3]{\phantom{x}}$	Cube root	cbrt(x)

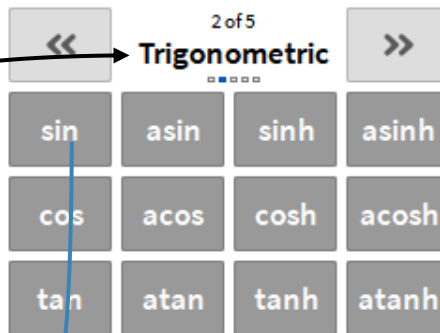




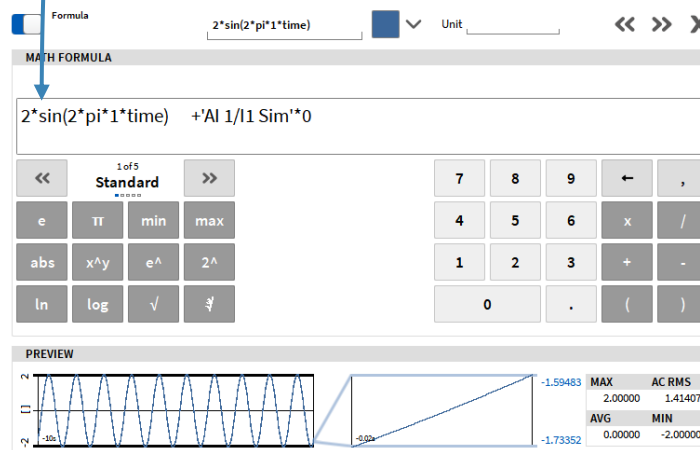
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# MATHEMATICAL OPERATIONS – TRIGONOMETRIC

①	Standard operations
②	Trigonometric operations
③	Logical operations
④	Measurement operations
⑤	Misc



Function	Description	Syntax
sin	Sine	sin(x)
asin	Arc sine	asin(x)
sinh	Hyperbolic sine	sinh(x)
asinh	Arc hyperbolic sine	asinh(x)
cos	Cosine	cos(x)
acos	Arc cosine	acos(x)
cosh	Hyperbolic cosine	cosh(x)
acosh	Arc hyperbolic cosine	acosh(x)
tan	Tangent	tan(x)
atan	Arc tangent	atan(x)
tanh	Hyperbolic tangent	tanh(x)
atanh	Arc hyperbolic tangent	atanh(x)

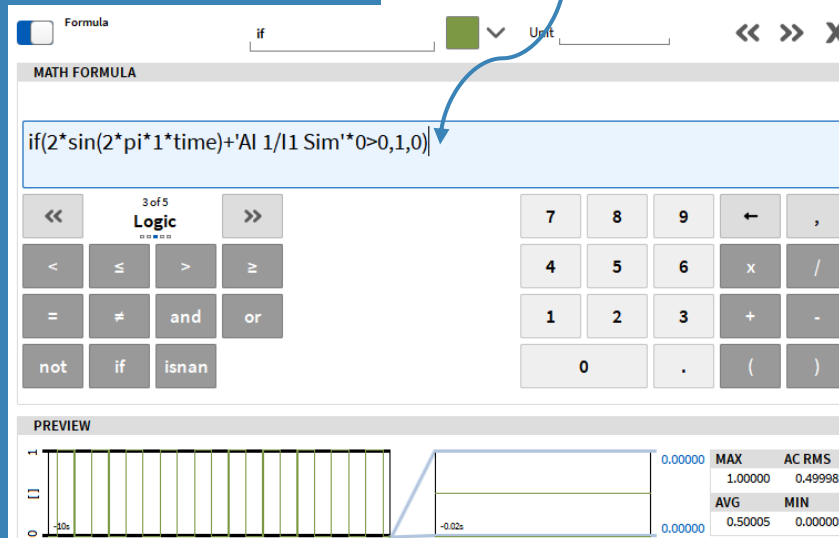
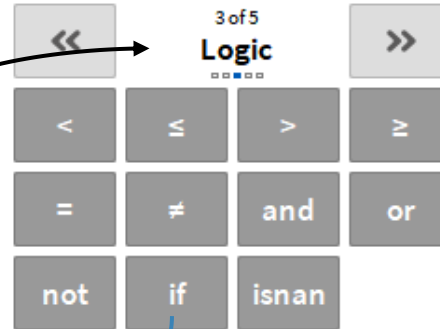




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# MATHEMATICAL OPERATIONS – LOGIC

- ① Standard operations
- ② Trigonometric operations
- ③ Logical operations
- ④ Measurement operations
- ⑤ Misc



Function	Description	Syntax
<	If 'value1' is less than 'value2', the result is 1.0 else 0.0	value1 < value2
<=	If 'value1' is less than or equals 'value2', the result is 1.0 else 0.0	value1 <= value2
>	If 'value1' is greater than 'value2', the result is 1.0 else 0.0	value1 > value2
>=	If 'value1' is greater than or equals 'value2', the result is 1.0 else 0.0	value1 >= value2
=	If 'value 1' equals 'value 2', the result is 1.0 else 0.0 (Two NaNs do not compare equal)	value1 == value2
!=	If 'value 1' is different than 'value 2', the result is 1.0 else 0.0	value1 != value2
and	Logic and: value1 != 0.0 and value2 != 0.0 → 1.0 value1 = 0.0 and value2 != 0.0 → 0.0 value1 != 0.0 and value2 = 0.0 → 0.0 value1 = 0.0 and value2 = 0.0 → 0.0	value1 and value2
or	Logic or: value1 != 0.0 or value2 != 0.0 → 1.0 value1 = 0.0 or value2 != 0.0 → 1.0 value1 != 0.0 or value2 = 0.0 → 1.0 value1 = 0.0 or value2 = 0.0 → 0.0	value1 or value2
not	Logic negation: If value = 0.0, the result is 1.0, else 0.0	not value
if	If condition is true, the result is 'true_val', otherwise 'false_val'	if(condition,true_val,false_val)
isnan	If value is NaN, result is 1.0, 0.0 otherwise	isnan(value)

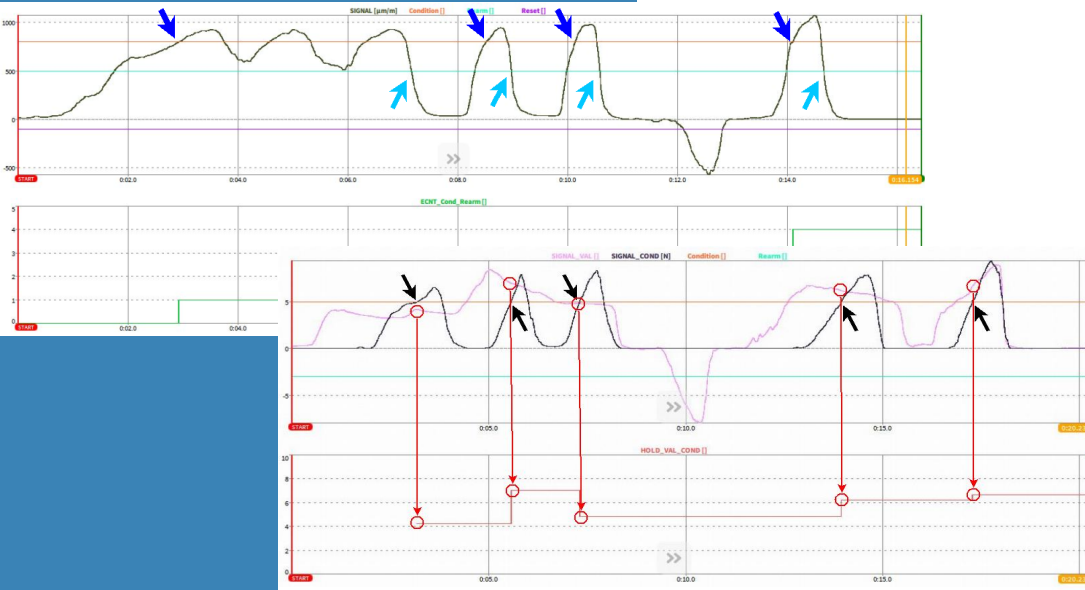
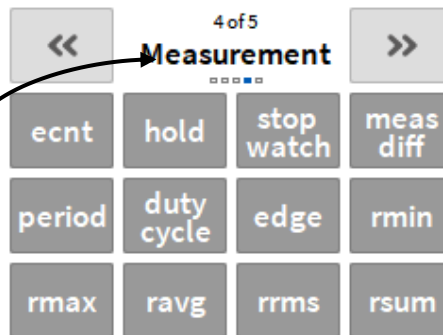




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# MATHEMATICAL OPERATIONS – MEASUREMENT

- ① Standard operations
- ② Trigonometric operations
- ③ Logical operations
- ④ Measurement operations
- ⑤ Misc



Function	Description	Syntax
ecnt <sup>1</sup>	Count number of edges on condition; condition is mandatory, rearm and reset parameter optional	ecnt(cond,rearm,reset)
hold <sup>2</sup>	Hold value at trigger condition; value and condition parameters are mandatory, init and rearm optional	hold(value,cond,init,rearm)
stopwatch <sup>3</sup>	Measure the timespan between two conditions in seconds; start and stop condition is both mandatory, reset is optional	stopwatch(start_cond,stop_cond, reset)
measdiff <sup>4</sup>	Measure the value difference of one channel between two conditions	measdiff(val,cond1,cond2)
period <sup>5</sup>	Measure the period duration in seconds between consecutive conditions with optional rearm condition	Edge(cond,rearm)
dutycycle <sup>6</sup>	Measure the dutycycle (from 0 to 1) between consecutive conditions with optional rearm condition	Dutycycle(cond,rearm)
edge <sup>7</sup>	Generate positive edge on cond with rearm condition	Edge(cond,rearm)
rmin <sup>8</sup>	Measure rolling overall minimum of a channel during a measurement with optional reset condition	rmin(value,reset)
rmax <sup>8</sup>	Measure rolling overall maximum of a channel during a measurement with optional reset condition	rmax(value,reset)
ravg <sup>8</sup>	Measure rolling overall average of a channel during a measurement with optional reset condition	ravg(value,reset)
rrms <sup>8</sup>	Measure rolling overall RMS of a channel during a measurement with optional reset condition	rrms(value,reset)
rsum <sup>8</sup>	Measure rolling overall sum of a channel during a measurement with optional reset condition	rsum(value,reset)
racrms <sup>8</sup>	Measure rolling overall ACRMS of a channel during a measurement with optional reset condition; Not included in the selection and must be typed manually	racrms(value,reset)
rp2p <sup>8</sup>	Measure rolling overall Peak-to-Peak of a channel during a measurement with optional reset condition; Not included in the selection and must be typed manually	Rp2p(value,reset)

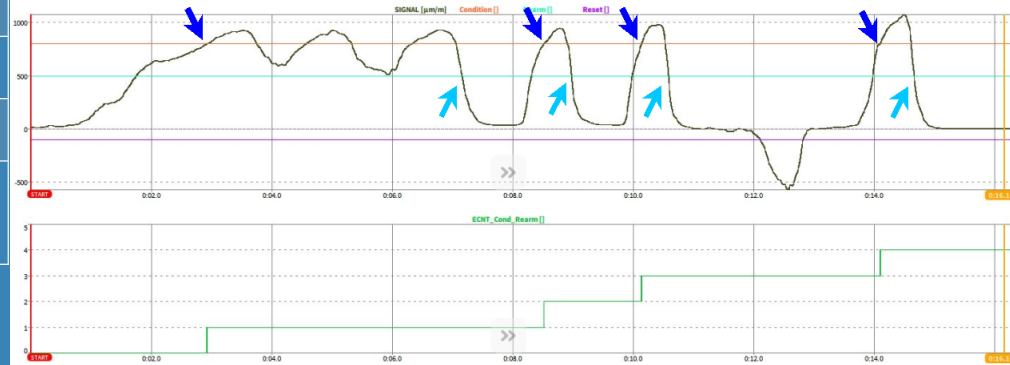
# MATHEMATICAL OPERATIONS – MEASUREMENT



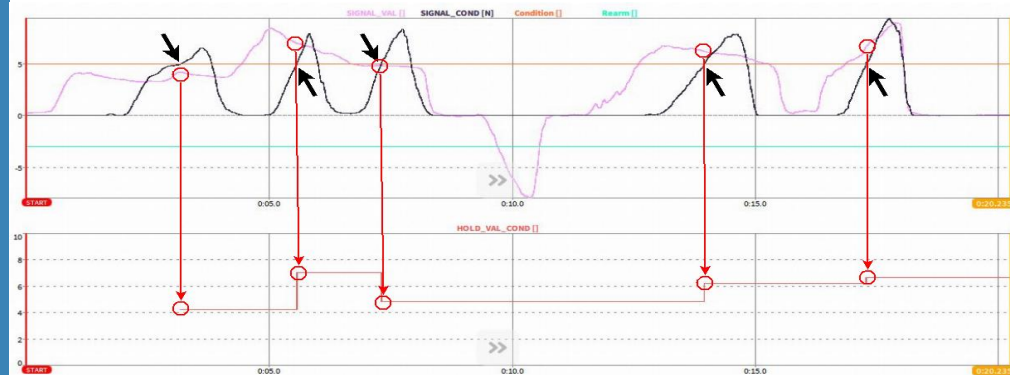
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- ① Standard operations
- ② Trigonometric operations
- ③ Logical operations
- ④ Measurement operations
- ⑤ Misc

```
ecnt('SIGNAL'>800,'SIGNAL'<500)
```



```
hold('SIGNAL_VAL';SIGNAL_COND'>5)
```

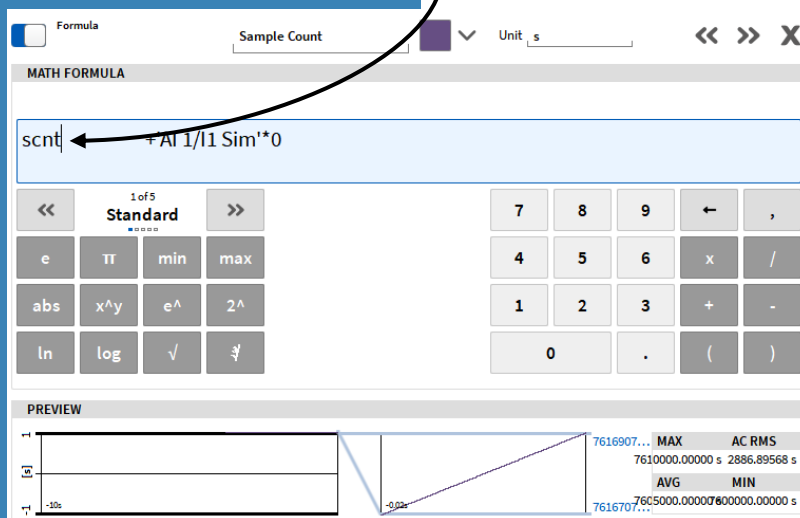
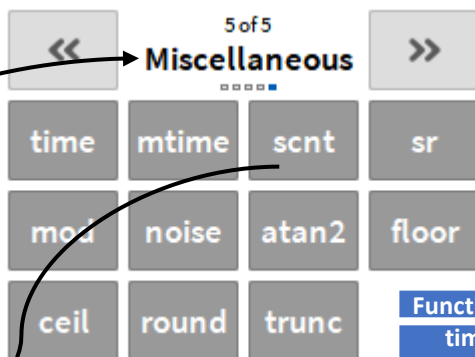




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# MATHEMATICAL OPERATIONS – MISC

- ① Standard operations
- ② Trigonometric operations
- ③ Logical operations
- ④ Measurement operations
- ⑤ Misc



Function	Description	Syntax
<b>time*</b>	Returns the elapsed time since acquisition (re)start in seconds	time
<b>mtime*</b>	Returns the elapsed time since measurement star in secondst	mtime
<b>scnt*</b>	Counts the number of samples since acquisition (re)start	scnt
<b>sr*</b>	Returns the Sample Rate in Hz	sr
<b>mod</b>	Remainder of division x/y, sign of x	mod(x,y)
<b>noise</b>	Creates Noise signal in the range [-x...+x]	noise(x)
<b>atan2</b>	Arc tangent of y/x using signs of arguments to determine the correct quadrant	atan2(y,x)
<b>floor</b>	Rounds x towards minus infinity	floor(x)
<b>ceil</b>	Rounds x towards plus infinity	ceil(x)
<b>round</b>	Round to nearest integer	round(x)
<b>trunc</b>	Round x towards zero	trunc(x)

\* A channel to which the function refers must be specified, i.e. in the following manner:  
 'Ref\_Ch'\*0+time



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# MATHEMATICAL OPERATIONS – MEASUREMENT TIME

① Measurement time function can be used to generate reference curves in time domain  
Create a formula determining the measurement time

② Open the scaling options of this channel which are accessible in the Channel List

③ The table scaling can be used to define the boundary points of the reference curve

④ Can be displayed in a Recorder to check if the channel(s) exceeds the limit or is within the limit

Formula Measurement Time Unit

MATH FORMULA

$\text{mtime} + 'AI\ 1/I1\ \text{Sim}' * 0$  ①

Channel Scaling ③

Scaling 2-point Table

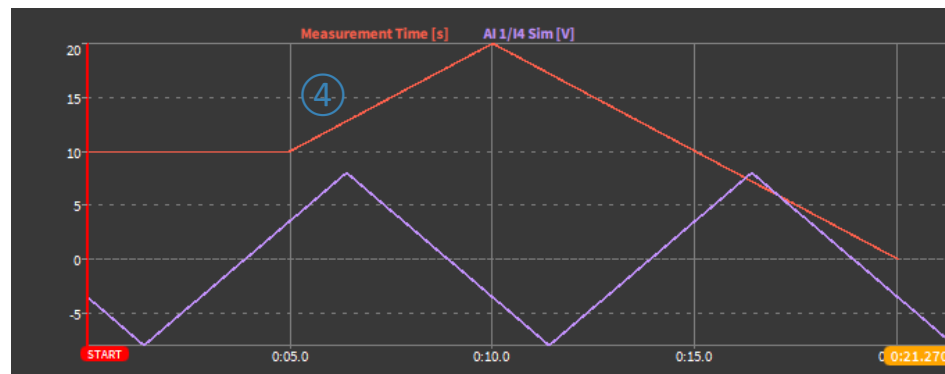
Unit V Copy Paste

X [V]	Y [V]	+
0	10	—
5	10	—
10	20	—
20	0	—

AVG AC RMS

Cancel Ok

②





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# MATHEMATICAL OPERATIONS – MEASUREMENT TIME

- ① Measurement time can be easily displayed on the screen as it can be dragged and dropped to a Text instrument directly from its properties

The screenshot displays the DEWETRON software interface. At the top, a timeline shows measurement intervals from 0:22.0 to 0:34.0, with a current time of 0:35.337. Below the timeline, a text box displays 'Measurement Time: 0:35.351'. To the right, the 'Properties' panel for a 'Text' instrument is open. The 'TEXT' section shows the text 'Measurement Time: #{Measurement Time}'. The 'SYSTEM DATA' section lists 'Time', 'Date', and 'Measurement Time' (marked with a circled 1). The 'STYLE' section has a checked 'Transparent background' option. An arrow points from the 'Measurement Time' property in the system data list to the text box on the screen.

# ARRAY MATH FORMULAS



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	Array channels such as Harmonics, FFT or CPB channels can be used in Formulas
①	Basic math operations for arrays with same dimensions supported: + - * /
②	Operations (+ - * /) with constants supported
	Output is always a new array channel with same dimensions

Formula

Formula 0

Unit

<< >> X

MATH FORMULA

②

①

Group name Formula

10\*"U1\_hRMS@POWER\_1PH"/"I1\_hRMS@POWER\_1PH"

<< 1 of 6 Standard >>

e  $\pi$  min max

abs  $x^y$   $e^x$   $2^x$

ln log  $\sqrt{x}$   $\sqrt[n]{x}$

7 8 9  $\leftarrow$  ,

4 5 6  $\times$  /

1 2 3 + -

0 . ( )

PREVIEW

1.00000e+9

0 3 6 9 12 15 18 21 24 27 30 33 36 39 42 45 48

# ARRAY MATH FORMULAS

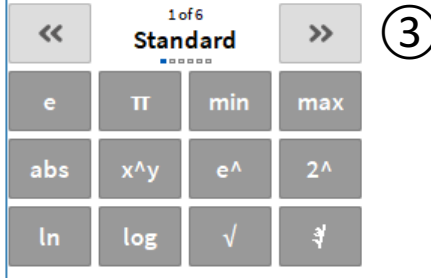


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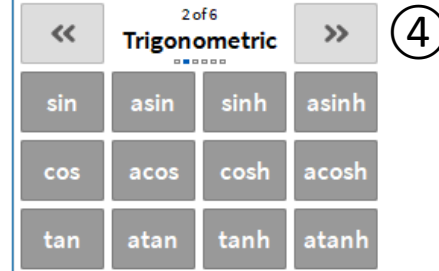
Possibility to use

- ③ Standard operators
- ④ Trigonometric operators
- ⑤ Logic operators

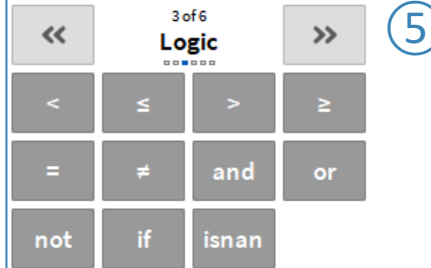
10\*log('U1\_hRMS@POWER\_1PH'/1)



'U1\_hRMS@POWER\_1PH'/'I1\_hRMS@POWER\_1PH'  
\*cos('I1\_hPHI@POWER\_1PH')



'U1\_hRMS@POWER\_3PH' and 'U2\_hRMS@POWER\_3PH'



# ARRAY MATH FORMULAS



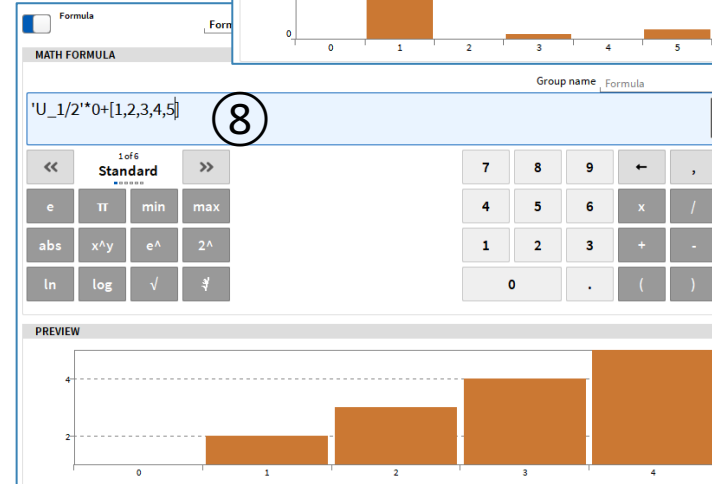
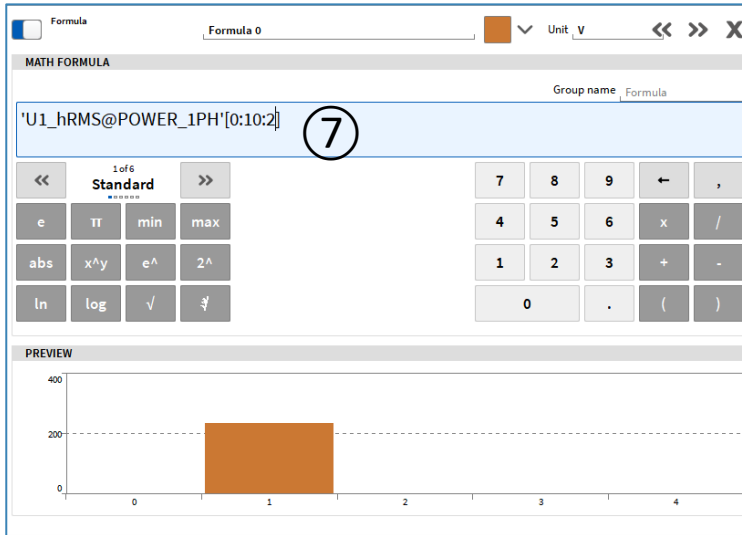
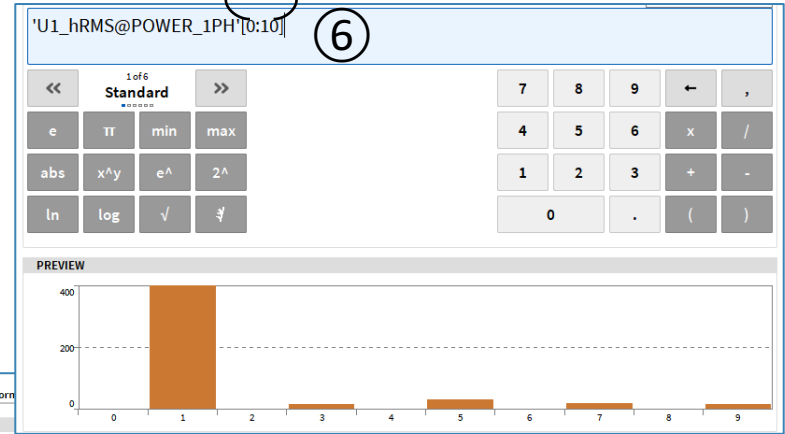
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> Extraction of adjacent elements into a new array in C++ / Python syntax (⑥)

- > First element of array is always 0!
- > Optional step size definition (⑦)

> Creation of arrays with constants (⑧)

1<sup>st</sup> Inclusive      Last Exclusive



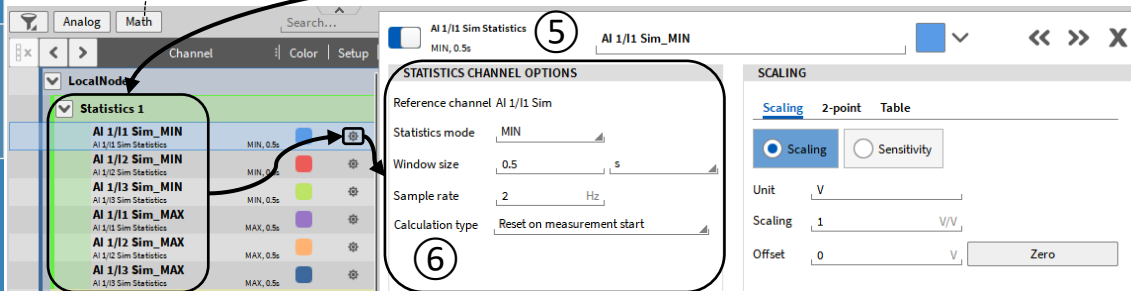
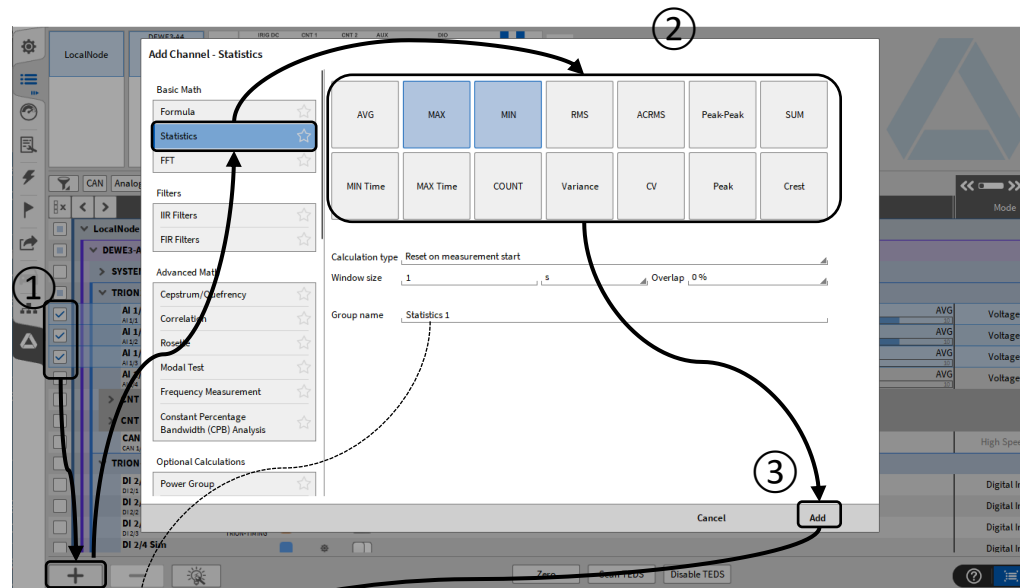




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# CREATING STATISTICS

- 1 Select one or several channels by checking their check boxes and press the + button
- 2 Select *Statistics*, choose the proper calculations (several can be selected) and the desired time window
- 3 Press *Add* afterwards to create these channels
- 4 A separate output channel for each reference channel and calculation is created
- 5 Changes can still be applied by entering the settings of the desired channel via the *Gear* button
- 6 Select if calculation (starting at acquisition start) shall be reset at recording start





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# CALCULATION REMARKS

Calculation remarks can be seen on the right hand side

If rolling (overall) statistics, i.e. maximum value during the measurement are required, refer to the functions in the table below which are available in the formula setup

*These formulas are reset at measurement start*

Additionally, user defined reset events can be defined, i.e. ch1 decreases 0

*racrms* and *rp2p* are not available in the menu but can be typed into the formula editor manually

$$\begin{aligned}
 AVG &= \frac{1}{N} \sum_{i=1}^N SignalLevel_i & ACRMS &= \sqrt{\frac{1}{N} \sum_{i=1}^N (SignalLevel_i - AVG)^2} \\
 MIN &= MIN\{SignalLevel_i\} \\
 MAX &= MAX\{SignalLevel_i\} & RMS &= \sqrt{\frac{1}{N} \sum_{i=1}^N (SignalLevel_i)^2} = \sqrt{AVG^2 + ACRMS^2}
 \end{aligned}$$

$i = 1 \dots N$   
 $N = \text{Sample Rate of Input Channel} * \text{Window Size}$

<b>rmin</b>	Measure rolling overall minimum of a channel during a measurement with optional reset condition	rmin(value,reset)
<b>rmax</b>	Measure rolling overall maximum of a channel during a measurement with optional reset condition	rmax(value,reset)
<b>avg</b>	Measure rolling overall average of a channel during a measurement with optional reset condition	avg(value,reset)
<b>rrms</b>	Measure rolling overall RMS of a channel during a measurement with optional reset condition	rrms(value,reset)
<b>rsum</b>	Measure rolling overall sum of a channel during a measurement with optional reset condition	rsum(value,reset)
<b>racrms</b>	Measure rolling overall ACRMS of a channel during a measurement with optional reset condition; Not included in the selection and must be typed manually	racrms(value,reset)
<b>rp2p</b>	Measure rolling overall Peak-to-Peak of a channel during a measurement with optional reset condition; Not included in the selection and must be typed manually	Rp2p(value,reset)



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# FURTHER STATISTICS (AVAILABLE SINCE R6.1)

- > **Peak-Peak:** Calculates the peak-peak value
- > **SUM:** Calculates the sum
- > **MIN Time:** Determines the time, where the minimum of the signal was reached
- > **MAX Time:** Determines the time, where the maximum of the signal was reached
- > **COUNT:** Counts the number of samples in one measurement block
- > **Variance:** Calculates the variance (squared ACRMS value)
- > **Coefficient of Variance (CV):** Calculates the Coefficient of variance (division of ACRMS and AVG)
- > **Peak:** Calculates the peak value
- > **Crest:** Calculates the crest factor (division of the MAX and RMS value)

**Add Channel - Statistics**

**Basic Math**

Formula

**Statistics**

Filters

FFT

Frequency Measurement

Example Plugin: Sum channels

Example Plugin: Sample Interpolator

Example Plugin: Demultiplex vector channel

**Advanced Math**

Power Group

Order Analysis

Swept Sine Analysis

Rosette

Psophometer

Sound Level

Matrix Sampler

AVG	MAX	MIN	RMS	ACRMS	Peak-Peak	SUM
MIN Time	MAX Time	COUNT	Variance	CV	Peak	Crest

Calculation type:

Window size:  s

Group name:

Cancel Add

# OVERLAPPING STATISTICS (AVAILABLE SINCE R6.1)



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## > Overlapping Window size

- > 0 % (behaviour until now)
- > 50 %
- > 75 %
- > 80 %
- > 90 %
- > 95 %

Calculation type

Window size  s

Group name

Overlap

0 %

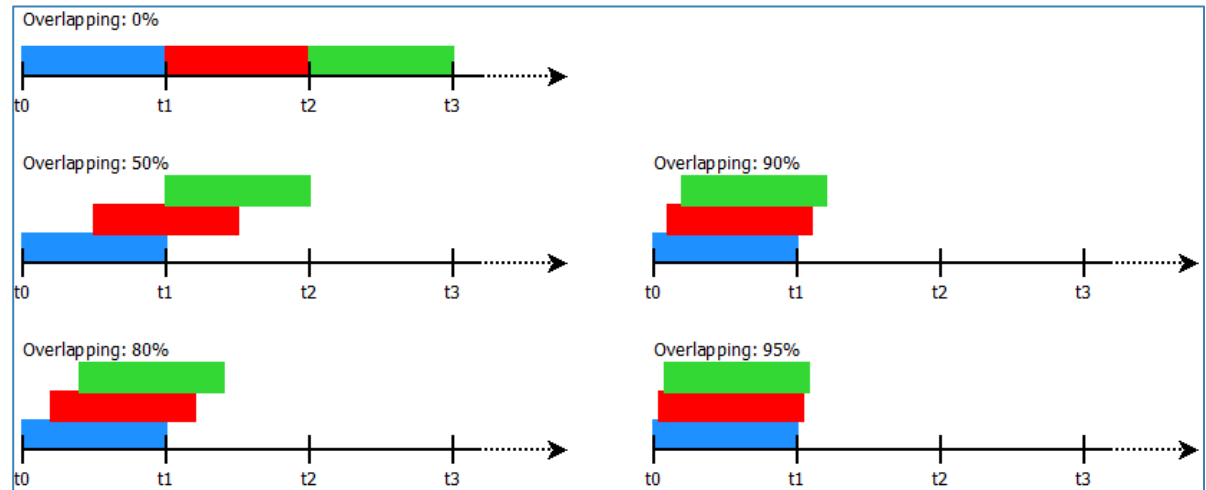
50 %

75 %

80 %

90 %

95 %



# OVERALL STATISTICS (AVAILABLE SINCE R6.1)

- > Outputs one overall value from recording start to recording end  
→ Reset on measurement start
- > No time history included

Add Channel - Statistics

Basic Math

- Formula
- Statistics**
- Filters
- FFT
- Frequency Measurement
- Example Plugin: Sum channels
- Example Plugin: Sample Interpolator
- Example Plugin: Demultiplex vector channel

Advanced Math

- Power Group
- Order Analysis
- Swept Sine Analysis
- Rosette
- Psophometer
- Sound Level
- Matrix Sampler

AVG	MAX	MIN	RMS	ACRMS	Peak-Peak	SUM
MIN Time	MAX Time	COUNT	Variance	Covariance	Peak	Crest

Calculation type: **Overall**

Group name: **Statistics 1**

Cancel Add

# TRIGGERED STATISTICS (AVAILABLE SINCE R6.2)

- > Begins statistics calculation on trigger
- > Trigger event can be on rising or falling edge
- > Stop modes:
  - Retrigger
  - Duration
  - Stop trigger

Add Channel - Statistics

Basic Math

Formula

Statistics

Filters

FFT

Frequency Measurement

Example Plugin: Sum channels

Example Plugin: Simple moving average

Example Plugin: Sample Interpolator

Example Plugin: Demultiplex vector channel

Advanced Math

Power Group

Order Analysis

Swept Sine Analysis

Rosette

Psophometer

Sound Level

AVG MAX MIN RMS ACRMS Peak-Peak SUM

MIN Time MAX Time COUNT Variance CV Peak Crest

Calculation type **Triggered**

Start trigger channel AI 1/1 Sim

Start trigger level 0.2 V Rising edge ☐ Rearm level 0 V

Stop mode **Stop trigger**

Stop trigger channel AI 1/1 Sim

Stop trigger level 2.4 V Falling edge ☐ Rearm level 0 V

Group name Statistics 1

Cancel Add

Stop mode

Stop trigger

Retrigger

Duration

Stop trigger

# RUNNING STATISTICS (AVAILABLE SINCE R6.2)



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- > Inherits sample rate of input channel
- > Looks back the window size on each new sample
- > Calculates statistic for this „look back“-window

**Add Channel - Statistics**

**Basic Math**

Formula

Statistics

Filters

FFT

Frequency Measurement

Example Plugin: Sum channels

Example Plugin: Simple moving average

Example Plugin: Sample Interpolator

Example Plugin: Demultiplex vector channel

**Advanced Math**

Power Group

Order Analysis

Swept Sine Analysis

Rosette

Psophometer

Sound Level

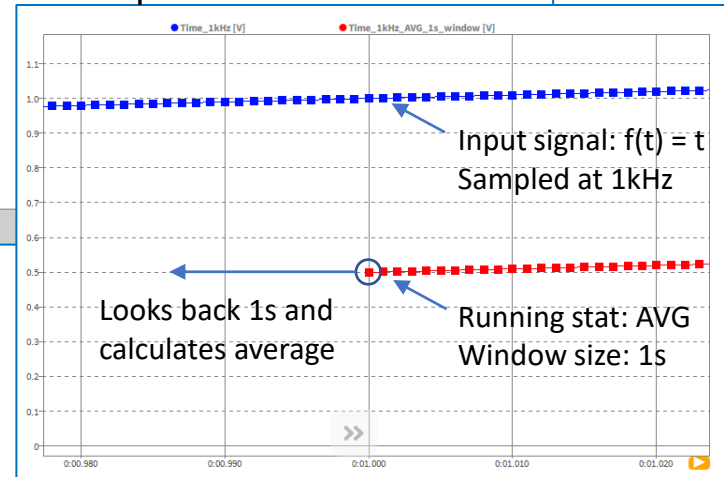
AVG	MAX	MIN	RMS	ACRMS	Peak-Peak	SUM
MIN Time	MAX Time	COUNT	Variance	CV	Peak	Crest

Calculation type: Running

Window size: 1 s

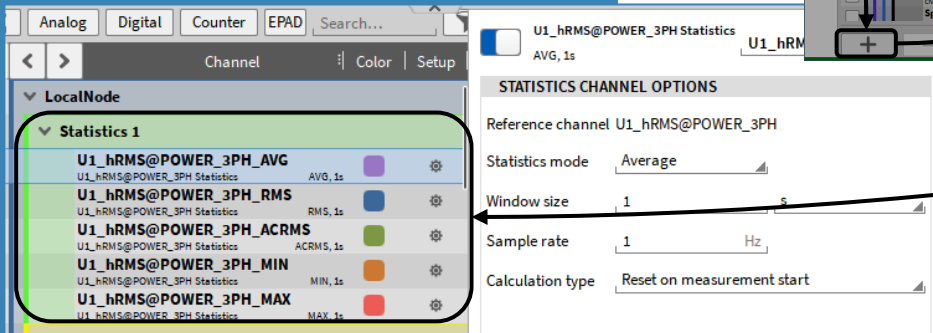
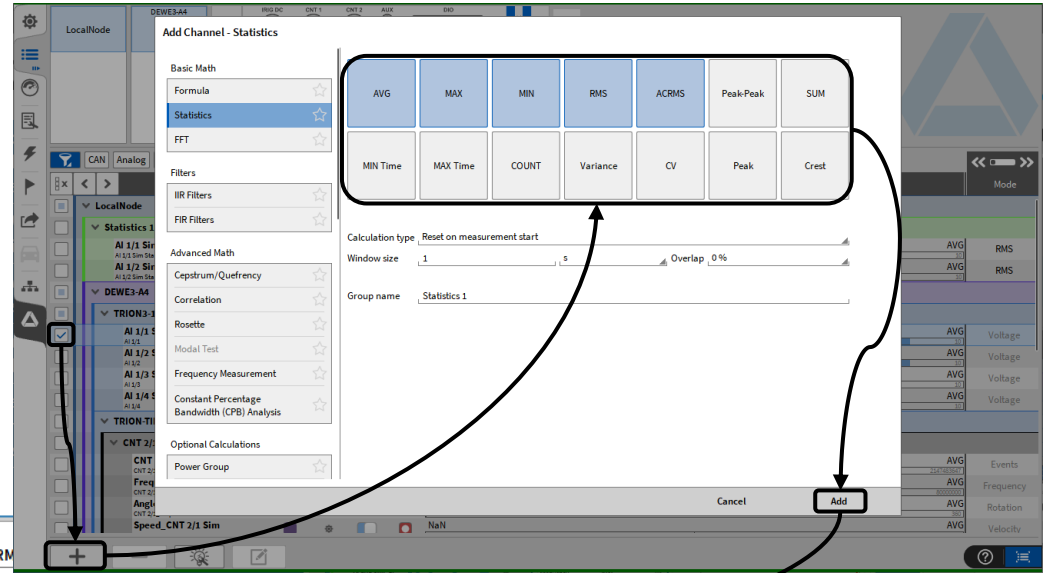
Group name: Statistics 1

Example:



# ARRAY MATH STATISTICS

- > Arrays can be assigned to Statistics
- > Output is always a new array channel with same dimensions







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# CREATING IIR-FILTERS

- 1 Select one or several channels to be filtered by checking their check boxes and press the + button
- 2 Select *Filters*, choose the proper one and its settings
- 3 Press *Add* afterwards to create these channels
- 4 A separate output channel for each filtered reference channel is created
- 5 Changes can still be applied by entering the settings of the desired channel via the *Gear* button

The screenshot illustrates the DEWETRON software interface for creating IIR filters. The 'LocalNode' tree on the left shows the project structure, including 'DEWE3-RM8' and 'TRION3-1810M-POWER-4'. The 'Channel' list in the center shows the selected channels (AI 1/11 Sim, AI 1/12 Sim, AI 1/13 Sim) and the newly created filtered channels (AI 1/11 Sim\_LP, AI 1/12 Sim\_LP, AI 1/13 Sim\_LP). The 'FILTER OPTIONS' dialog box is open, showing the configuration for a Lowpass filter with a frequency of 2500 Hz, Bessel characteristic, and order 4. The 'GAIN PREVIEW' section displays a graph of the filter's frequency response, and the 'SCALING' section shows the scaling type set to 'Scaling'.



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# CREATING FIR-FILTERS

- 1 Select one or several channels to be filtered by checking their check boxes and press the + button
- 2 Select *Filters*, choose the proper one and its settings
- 3 Press *Add* afterwards to create these channels
- 4 A separate output channel for each filtered reference channel is created
- 5 Changes can still be applied by entering the settings of the desired channel via the *Gear* button
- 6 Additional channels can be added or deselected

The screenshot illustrates the steps for creating FIR filters in the DEWETRON software. The interface is divided into several panels:

- Top Panel:** Shows the 'Add Channel - FIR Filters' dialog box. It includes options for filter type (Low pass, High pass, Band pass, Band stop), filter frequency (2500 Hz), window (Kaiser), and filter length (31). The 'Add' button is highlighted with a red circle.
- Middle Panel:** Shows the 'FIR Filter Channels' list. It contains channels like 'AI 1/1 Sim', 'AI 1/2 Sim', and 'AI 1/3 Sim'. A red circle highlights the 'Add' button next to the list.
- Bottom Panel:** Shows the 'FIR FILTER OPTIONS' dialog box. It includes settings for filter type, length, window, delay, and compensation. The 'Add' button is highlighted with a red circle.
- Right Panel:** Shows the 'INPUT CHANNELS' list. It contains channels like 'AI 1/1 Sim', 'AI 1/2 Sim', and 'AI 1/3 Sim'. A red circle highlights the 'Add' button next to the list.
- Bottom Right Panel:** Shows a frequency response plot with a red line representing the filter's response.

# FILTER SETTINGS



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## Available Filters:

- > Lowpass
- > Highpass
- > Bandpass
- > Bandstop
- > Integrator (Single or Double)
- > Differentiator (Single or Double)

- > Lowpass & Highpass:
  - >  $f_{C\ max} = \frac{f_s}{2} - 50\ Hz$
  - > Bessel or Butterworth characteristic
  - > 2<sup>nd</sup>, 4<sup>th</sup>, 6<sup>th</sup>, 8<sup>th</sup> or 10<sup>th</sup> order
- > Bandpass & Bandstop
  - >  $f_l = 0 \dots f_h - 1\ Hz$
  - >  $f_h = f_l + 1\ Hz \dots \frac{f_s}{2} - 50\ Hz$
  - > Bessel or Butterworth characteristic
  - > 2<sup>nd</sup>, 4<sup>th</sup>, 6<sup>th</sup>, 8<sup>th</sup> or 10<sup>th</sup> order
- > Integrator & Differentiator
  - > Single or Double Integration/Differentiation
  - > Enable low (Integrator) or high (Differentiator) frequency component filtering
    - >  $f_{C\ max} = \frac{f_s}{2} - 50\ Hz$
    - > Bessel or Butterworth characteristic
    - > 2<sup>nd</sup>, 4<sup>th</sup>, 6<sup>th</sup>, 8<sup>th</sup> or 10<sup>th</sup> order
- > Why filter frequency components during Integration / Differentiation or not?
  - > → Integration of a velocity:
    - > With filtering enabled (no DC components), this calculation determines only the distance travelled from one data sample to the next one
    - > With filtering disabled (DC components included), this calculation determines the entire travelled distance as the determined distance from one data sample to the next is summed up



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# OFFLINE MATH – ADDING CALCULATIONS TO THE DATA FILE

- ① Basic and Advanced Math can be created offline
- ② Offline created channels are marked with a green *Stored* button
- ③ Any changes to a data file can be stored with the *Store* button

## Add Channel

### Basic Math

#### Formula

#### Statistics

#### Filters

#### FFT

### Advanced Math

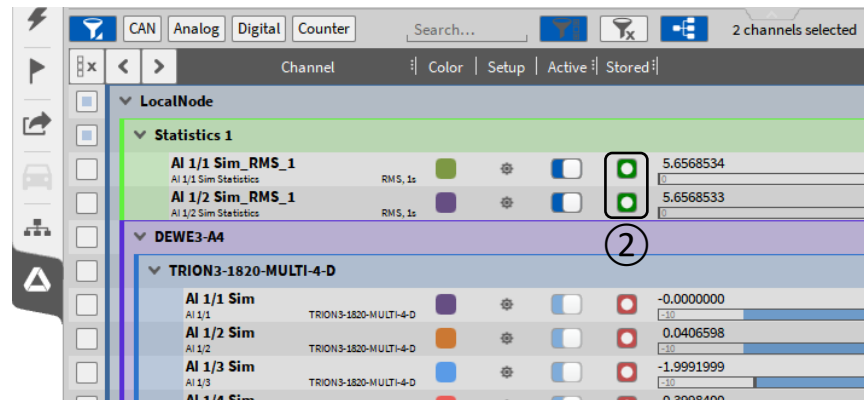
#### Power Group

#### Order Analysis





#### Swept Sine Analysis

#### Rosette

#### Psophometer



## Remarks:

- > Possibility to edit settings of software channels in \*.dmd-files. Function must be activated once after opening \*.dmd-file (④)     (④)
- > All existing channels and calculations created with + button can be edited if source channels are stored
- > It is also possible to edit the settings of hardware channels, but only the name and the unit.
- > Please keep in mind that the results of an offline calculated channel can differ from an online calculated channel, i.e. filters as they are oscillating at the beginning