

Math Channels – significato dei canali

Domanda:

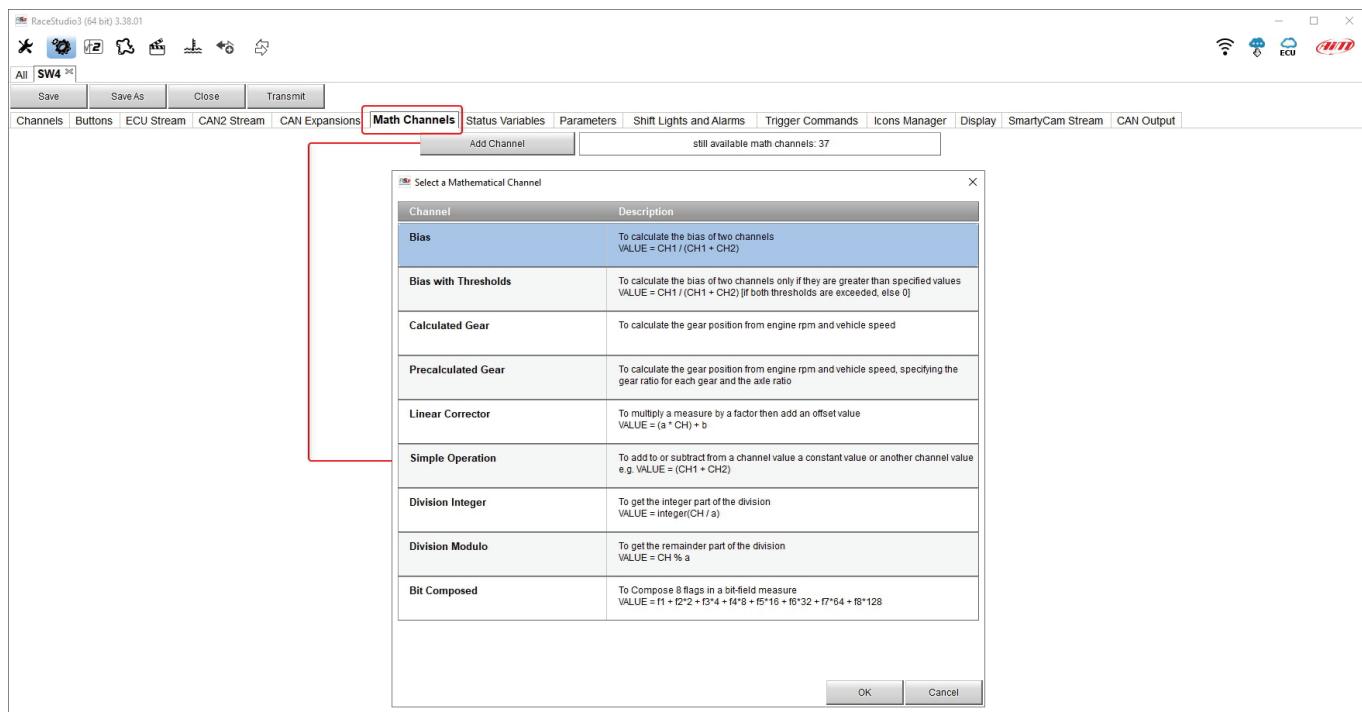
Come posso utilizzare i canali matematici e come devo interpretarne i valori?

Risposta:

I canali matematici utilizzano uno o più canali della configurazione per calcoli matematici ottenendo in questo modo un canale aggiuntivo sulla base dei valori istantanei di riferimento registrati durante la sessione.

Per creare i canali matematici:

- entrare nella tab "Math Channels"
- cliccare "Add Channel" ed appare una finestra che descrive la funzione di ciascuno dei canali matematici disponibili.





FAQ

RS3

Bias: il canale matematico Bias esprime la percentuale di intervento del primo di due canali selezionati (i canali devono avere la stessa funzione), calcolandolo in rapporto con la loro somma.
Nell'esempio seguente è espresso il rapporto tra la pressione del freno anteriore e posteriore.

The screenshot shows the RaceStudio3 interface with the 'Math Channels' tab selected. A dialog box titled 'Select a Mathematical Channel' is open, listing various operations. The 'Bias' operation is selected, which calculates the bias of two channels as $CH1 / (CH1 + CH2)$. To the right, a 'Mathematical Channel Settings' dialog box is open, showing the configuration for the 'Bias' channel. The settings include:

Name	Bias
Sampling Frequency	10 Hz
Unit of Measure	%
Display Precision	1 decimal place
Bias Mathematical Operation	
First Channel	Front Brake Pres
Second Channel	Rear Brake Pres
VALUE = CH1 / (CH1 + CH2)	

Buttons for 'Save', 'Cancel', 'OK', and 'Cancel' are visible at the bottom of both dialogs.



RS3

Bias with Threshold: la funzione del canale matematico è la medesima del canale "Bias", ma il calcolo viene eseguito a partire da precisi valori soglia. Questa impostazione aggiuntiva è utile se i canali considerati presentano un comportamento non stabile ai valori bassi.

Il canale matematico assume valore diverso da zero se entrambi i canali hanno valori istantanei superiori ai valori soglia impostati.

The screenshot shows the RaceStudio3 interface with the 'Math Channels' tab selected. A red arrow points from the 'Bias with Thresholds' entry in the 'Select a Mathematical Channel' dialog to the corresponding settings in the 'Mathematical Channel Settings' dialog.

Select a Mathematical Channel Dialog (Left):

Channel	Description
Bias	To calculate the bias of two channels VALUE = CH1 / (CH1 + CH2)
Bias with Thresholds	To calculate the bias of two channels only if they are greater than specified values VALUE = CH1 / (CH1 + CH2) [if both thresholds are exceeded, else 0]
Calculated Gear	To calculate the gear position from engine rpm and vehicle speed
Precalculated Gear	To calculate the gear position from engine rpm and vehicle speed, specifying the gear ratio for each gear and the axle ratio
Linear Corrector	To multiply a measure by a factor then add an offset value VALUE = (a * CH) + b
Simple Operation	To add to or subtract from a channel value a constant value or another channel value e.g. VALUE = (CH1 + CH2)
Division Integer	To get the integer part of the division VALUE = integer(CH / a)
Division Modulo	To get the remainder part of the division VALUE = CH % a
Bit Composed	To Compose 8 flags in a bit-field measure VALUE = f1 + f2*2 + f3*4 + f4*8 + f5*16 + f6*32 + f7*64 + f8*128

Mathematical Channel Settings Dialog (Right):

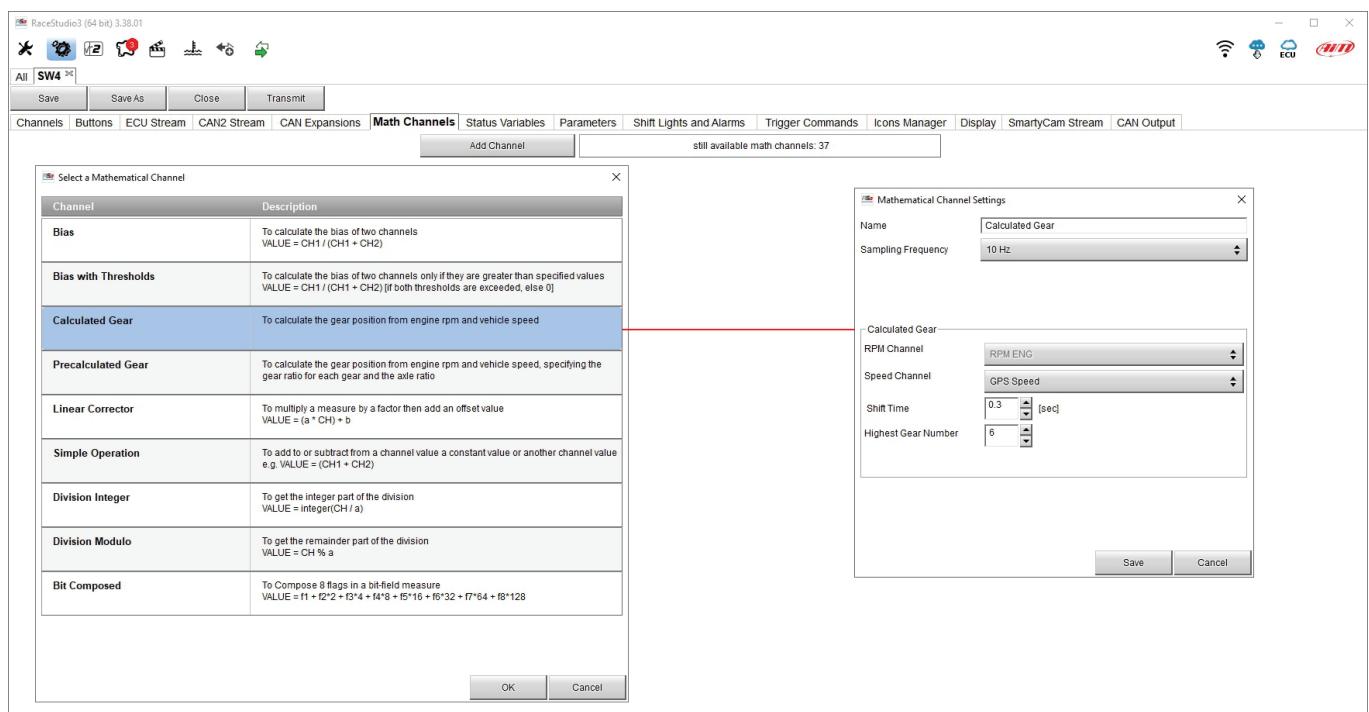
Name	Sampling Frequency	Unit of Measure	Display Precision
Bias w Thrs	10 Hz	%	1 decimal place
Bias Mathematical Operation			
First Channel	Mn. Threshold	Front Brake Pres	2 bar
Second Channel	Rear Brake Pres	2 bar	VALUE = CH1 / (CH1 + CH2) [if both thresholds are exceeded, else 0]

Buttons: OK, Cancel, Save, Cancel



RS3

Calculated Gear: questo canale matematico è in grado di calcolare la marcia, selezionando i canali di riferimento per RPM e velocità oltre al tempo di cambiata ed al numero massimo di marce. Una volta trasmessa la configurazione è necessario effettuare un giro di calibrazione, così che il sistema sia in grado di calcolare ciascun rapporto di trasmissione.





RS3

Pre-Calculated Gear: grazie a questo canale matematico, è possibile pre-calcolare la marcia, selezionando i canali RPM e velocità ed inserendo le informazioni mancanti, in particolare tutti i rapporti di trasmissione delle marce, la circonferenza dello pneumatico ed il rapporto al ponte. Nel caso in cui vi sia una trasmissione finale (es.: moto), moltiplicare il rapporto di trasmissione primario per il rapporto di trasmissione finale ed inserire il risultato nel campo "Axe Ratio". Utilizzando questo canale matematico, il giro di calibrazione non è necessario.

The screenshot shows the RaceStudio3 interface with the 'Math Channels' tab selected. A red line highlights the 'PreCalculated Gear' row in the 'Select a Mathematical Channel' list. The right panel displays the 'Mathematical Channel Settings' for 'PreCalcGear'. The settings include:

- Name: PreCalcGear
- Sampling Frequency: 10 Hz
- RPM Channel: RPM
- Speed Channel: GPS Speed
- Wheel Circumference: 1600 [mm]
- Axle Ratio (Load Shaft / Main Shaft): 1
- Shift Time: 0.3 [sec]
- Highest Gear Number: 6
- Gear Ratio (Load Shaft / Main Shaft):

1	7	2	5.5	3	4.5
4	3	5	2	6	1

Buttons at the bottom of both panels include OK, Cancel, Save, and Close.



FAQ

RS3

Linear Corrector: è possibile applicare un fattore moltiplicativo ed un offset positivo/negativo al valore istantaneo di un canale, così da poterne correggere il valore finale.

Nell'immagine seguente, il canale Lambda è sottoposto ad operazione (moltiplicatore) per ottenere il valore AFR relativo.

The screenshot shows the RaceStudio3 (64 bit) 3.38.01 interface. The top menu bar includes Save, Save As, Close, Transmit, and various system icons. The main toolbar has tabs for All, SW4, Channels, Buttons, ECU Stream, CAN2 Stream, CAN Expansions, Math Channels (which is selected), Status Variables, Parameters, Shift Lights and Alarms, Trigger Commands, Icons Manager, Display, SmartyCam Stream, and CAN Output. Below the toolbar is a button labeled 'Add Channel' and a note 'still available math channels: 37'. The central area displays two windows: 'Select a Mathematical Channel' and 'Mathematical Channel Settings'.

Select a Mathematical Channel: This window lists various mathematical operations:

- Bias: To calculate the bias of two channels. $VALUE = CH1 / (CH1 + CH2)$
- Bias with Thresholds: To calculate the bias of two channels only if they are greater than specified values. $VALUE = CH1 / (CH1 + CH2)$ if both thresholds are exceeded, else 0.
- Calculated Gear: To calculate the gear position from engine rpm and vehicle speed.
- Precalculated Gear: To calculate the gear position from engine rpm and vehicle speed, specifying the gear ratio for each gear and the axle ratio.
- Linear Corrector**: To multiply a measure by a factor then add an offset value. $VALUE = (a * CH) + b$
- Simple Operation: To add to or subtract from a channel value a constant value or another channel value e.g. $VALUE = (CH1 + CH2)$
- Division Integer: To get the integer part of the division. $VALUE = \text{integer}(CH / a)$
- Division Modulo: To get the remainder part of the division. $VALUE = CH \% a$
- Bit Composed: To Compose 8 flags in a bit-field measure. $VALUE = f1 * f2^2 + f3^4 + f4^8 + f5^16 + f6^32 + f7^64 + f8^128$

Mathematical Channel Settings: This window shows the configuration for the selected 'Linear Corrector' operation:

- Name: LinearCorr
- Channel: M800 LAMBDA1 (lambda)
- Linear Correction Parameters:
 - Multiplier (a): 0.680
 - Offset (b): 0.000
- Function: Lambda
- Sampling Frequency: 10 Hz
- Unit of Measure: lambda
- Display Precision: 1 decimal place

At the bottom of the 'Select a Mathematical Channel' window are OK and Cancel buttons.



RS3

Simple Operation: a partire da un canale di riferimento, è possibile creare un nuovo canale, al quale viene sommato/sottratto un fattore costante oppure il valore istantaneo di un altro canale presente nella configurazione.

Nell'esempio seguente, il valore istantaneo della pressione barometrica è sottratto a quello della pressione dell'aria nel condotto di aspirazione, per ottenere il valore di pressione turbo, dato dalla differenza di valore tra i due canali durante la sessione.

The screenshot shows the RaceStudio3 software interface with the 'Math Channels' tab selected. A sub-dialog titled 'Select a Mathematical Channel' is open, listing various mathematical operations. The 'Simple Operation' option is highlighted with a blue background. To the right, a detailed configuration dialog for 'Bost' is shown, with a red arrow pointing from the 'Simple Operation' entry in the list to the 'Formula' field of the dialog. The formula is set to $M800 MANIFPRES - M800 EXHAUST PRESS$.

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Bias	To calculate the bias of two channels VALUE = CH1 / (CH1 + CH2)
Bias with Thresholds	To calculate the bias of two channels only if they are greater than specified values VALUE = CH1 / (CH1 + CH2) [if both thresholds are exceeded, else 0]
Calculated Gear	To calculate the gear position from engine rpm and vehicle speed
Precalculated Gear	To calculate the gear position from engine rpm and vehicle speed, specifying the gear ratio for each gear and the axle ratio
Linear Corrector	To multiply a measure by a factor then add an offset value VALUE = (a * CH) + b
Simple Operation	To add to or subtract from a channel value a constant value or another channel value e.g. VALUE = (CH1 + CH2)
Division Integer	To get the integer part of the division VALUE = integer(CH / a)
Division Modulo	To get the remainder part of the division VALUE = CH % a
Bit Composed	To Compose 8 flags in a bit-field measure VALUE = f1*2 + f3*4 + f4*8 + f5*16 + f6*32 + f7*64 + f8*128



FAQ

RS3

Division integer: questo canale matematico restituisce la parte intera di una divisione.
Esempio: M800 CHANN1/1000: con M800 CHANN1 = 8530 Division integer=8

The screenshot shows the RaceStudio3 (64 bit) 3.38.01 interface. The top menu bar includes Save, Save As, Close, Transmit, Channels, Buttons, ECU Stream, CAN2 Stream, CAN Expansions, Math Channels (which is selected), Status Variables, Parameters, Shift Lights and Alarms, Trigger Commands, Icons Manager, Display, SmartyCam Stream, and CAN Output. The main window displays a list of available math channels and a configuration dialog for a new one.

Select a Mathematical Channel dialog (left):

Channel	Description
Bias	To calculate the bias of two channels VALUE = CH1 / (CH1 + CH2)
Bias with Thresholds	To calculate the bias of two channels only if they are greater than specified values VALUE = CH1 / (CH1 + CH2) [if both thresholds are exceeded, else 0]
Calculated Gear	To calculate the gear position from engine rpm and vehicle speed
Precalculated Gear	To calculate the gear position from engine rpm and vehicle speed, specifying the gear ratio for each gear and the axle ratio
Linear Corrector	To multiply a measure by a factor then add an offset value VALUE = (a * CH) + b
Simple Operation	To add to or subtract from a channel value a constant value or another channel value e.g. VALUE = (CH1 + CH2)
Division Integer	To get the integer part of the division VALUE = integer(CH / a)
Division Modulo	To get the remainder part of the division VALUE = CH % a
Bit Composed	To Compose 8 flags in a bit-field measure VALUE = f1 + f2*2 + f3*4 + f4*8 + f5*16 + f6*32 + f7*64 + f8*128

Mathematical Channel Settings dialog (right):

Name	DivisionInteger
Sampling Frequency	10 Hz
Display Precision	1 decimal place
Division Integer Mathematical Operation	First Channel: M800 CHANN1 Divider: 1000 #
VALUE = integer(CH / a)	
Save	Cancel



FAQ

RS3

Division Modulo: questo canale restituisce il resto in una divisione con risultato intero.
Esempio: M800 CHANN1/1000: con M800 CHANN1= 8530 Division Modulo = 530.

The screenshot shows the RaceStudio3 (64 bit) 3.38.01 interface. The top menu bar includes Save, Save As, Close, Transmit, Channels, Buttons, ECU Stream, CAN2 Stream, CAN Expansions, Math Channels (which is selected), Status Variables, Parameters, Shift Lights and Alarms, Trigger Commands, Icons Manager, Display, SmartyCam Stream, and CAN Output. The main window displays a 'Select a Mathematical Channel' dialog box and a 'Mathematical Channel Settings' configuration dialog box.

Select a Mathematical Channel Dialog:

Channel	Description
Bias	To calculate the bias of two channels VALUE = CH1 / (CH1 + CH2)
Bias with Thresholds	To calculate the bias of two channels only if they are greater than specified values VALUE = CH1 / (CH1 + CH2) [if both thresholds are exceeded, else 0]
Calculated Gear	To calculate the gear position from engine rpm and vehicle speed
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Linear Corrector	To multiply a measure by a factor then add an offset value VALUE = (a * CH) + b
Simple Operation	To add or subtract from a channel value a constant value or another channel value e.g. VALUE = (CH1 + CH2)
Division Integer	To get the integer part of the division VALUE = integer(CH / a)
Division Modulo	To get the remainder part of the division VALUE = CH % a
Bit Composed	To Compose 8 flags in a bit-field measure VALUE = f1 + f2*2 + f3*4 + f4*8 + f5*16 + f6*32 + f7*64 + f8*128

Mathematical Channel Settings Dialog:

Name: DivisionModulo
Sampling Frequency: 10 Hz
Display Precision: 1 decimal place
Division Integer Mathematical Operation:
First Channel: M800 CHANN1
Divider: 1000
Value: VALUE = CH % a

Buttons: OK, Cancel, Save



FAQ

RS3

Bit composed: sono necessari sino ad 8 canali con valore 0/1, utilizzabili per comporre i singoli bit di un byte. Normalmente questo canale viene utilizzato per comporre più informazioni nel singolo canale di un byte da mandare via CAN Bus.

The screenshot shows the RaceStudio3 software interface. On the left, there is a list of available mathematical channels. One channel, "Bit Composed", is selected and highlighted in blue. On the right, a detailed configuration dialog for "BitComposed" is open. The dialog includes fields for "Name" (set to "BitComposed"), "Sampling Frequency" (set to "10 Hz"), and "Display Precision" (set to "no decimal place"). Under the "Bit Composing Operation" section, eight checkboxes are listed, each mapping a flag channel (f1-f8) to a physical button (Left Button 2-Left Button 5, Right Button 2-Right Button 5). A red line connects the "Bit Composed" entry in the list to the "Bit Composing Operation" section of the dialog. At the bottom of the dialog are "Save" and "Cancel" buttons.