911977_TMSImgChannel.tiff ¬ Channel Operations

Channel operations are used for manipulating channels. This basically works like the <*Import*> function (;TMSImgChannel.rtfd;Import;¬), but provides additional flexibility in processing the imported channel.

While the import function copies the source information into the destination channel(s) in a one-to-one relationship, the channel operations function lets you use mathematical formulas to change the imported information.

These are the predefined formulas that are always available:

paste.tiff ¬
Figure: Predefined formulas for the Channel Operations function

Note: The identifier **q** always represents the source channel; **z** always represents the destination channel. No other identifier is available nor permitted. The contents of the channels are normalized to a range from 0 to 1.

ABS (q - z)
This formula calculates the absolute value of the difference between the source and destination channel. It is especially useful for comparing images, for example comparing a filtered image with the original one.

(q + z) * 0.5
The two channels are mixed, taking 50% from each of them.

AND (q, z)
Logical AND operation (suitable for bitmaps).

OR (q, z)
Logical OR operation (suitable for bitmaps).

XOR (q, z)
Logical XOR operation (suitable for bitmaps).

q
The source channel is simply copied (equal to the <*Import*> function).

NOT (z)
The destination channel is inverted.

NOT (q)
The source channel is inverted and copied to the destination channel.

The next five formulas use special arithmetic functions:
IF (e,a,b) If e = 0, the functions returns a,
LT(a,b) **L**ower **T**han; returns 1 if a < b, otherwise 0 is
GT(a,b) **G**reater **T**han; returns 1 if a > b, otherwise 0 is
EQ(a,b) **EQ**ual; returns 1 if a = b, otherwise 0 is

IF (LT (q , z) , q , z)
The smaller value of each source and destination value is set.

IF (GT (q , z) , q , z)
The greater value for each source and destination value is set.

IF (LT (q , z) , 0 , 1)
If q<z, the result is 0 (i.e. black for B/W images), otherwise it is 1 (i.e., white for B/W images).

IF (GT (q , z) , 0 , 1)
If q>z, the result is 0 (i.e. black for B/W images), otherwise it is 1 (i.e., white for B/W images).

IF (EQ (q , z) , 0 , 1)
If q=z, the result is 0 (i.e., black for B/W images), otherwise it is 1 (i.e., white for B/W images). If two B/W images are compared with this function, you get white areas for the pixels that differ. The other parts will be black.

New
If you want to define your own formulas, click the <*New*> command. This will open the following panel, in which you can enter your formula.
503118_paste.tiff ¬
Figure: The panel for entering new formulas

Note: New formulas are only temporary; they can't be saved or loaded. When quitting OneVision, they will be deleted.

After entering the formula and clicking <*OK*>, the parser will check the formula and, if it is correct, it will be added to the formula list. Otherwise an error message will be displayed.

The values of the channels are normalized to range from 0 to 1. The expression ª1-zº inverts the values in the destination channel.

If a formula is used for the first time, some setup calculations have to be done, depending on your computer system and the formula. In

this case, the <*New*> button will change to a percent counter, tracing the progress of the calculation

Parser definitions
Built-in operators in their order of precedence:

~	2-bit complement (long)
^	exponential
* /	multiply, divide
+ -	add, subtract
<< >>	shift left (=*2), shift right (=/2)
&	bitwise AND (long)
|	bitwise OR (long)

Digital formats:

Binary:	%1111,%00101
Hex:	$0f,0xfF0,0X0FF
Okt:	0127,0888
Dez:	1232,-12,4E-17,-4E3

Built -in constants are pi and e (small letters required).
Example: 2pi translates to 2*pi.

If the character 'X' is to be used as a variable, you may not write 0x to express 0*x.

No case sensitivity is used except:
e -> represents the Euler constant
E -> is used as exponent for decimal number

Square brackets are not allowed.

The following mathematical functions can be used:
ACOS(a)
ACOSH(a)

ASIN(a)
ASINH(a)
ATAN(a)
ATANH(a)
CEIL(a)
COS(a)
COSH(a)
ABS(a)
FLOOR(a)
LOG(a)
SIN(a)
SINH(a)
SQRT(a)
TAN(a)
TANH(a)
LB(a)
LG(a)
SQR(a)
FACT(a)
MIN(a,b)
MAX(a,b)
COT(a)
ACOT(a)

Next: ;TMSImgChannel.rtfd;;¬ Image Channels