ocf

keys:	**[from]**	*<number>*	first source picture
	with	*<number>*	second source picture
	to	*<number>*	output picture
	rings	*<number>*	number of ring sections that are compared
	radius	*<n1>, <n2>*	minimum, maximum radius of compared ring sections
	mark	*<number>*	mark rings on display
		<yes or no>	
options:	**full**		correlate full circular rings
	verify		prints information about the correlation process

Use **ocf** to determine the rotation that is necessary to bring two similar but misorientated pictures into register, or to detect rotational periodicity in a picture.

Examples

```
ocf 6 with 10 full
```

This command sets *theta* to the angle in radians by which picture 10 must be rotated clockwise for it to match picture 6.

```
ps 1 3; ps 2 4; ocf 3 with 4 verify
```

This command determines the misorientation of pictures 1 and 2, even if they are displaced laterally. It sends information about the process to the console.

```
ocf rings 3 radius 40,60 to 91
```

This command stores in picture 91 the auto-correlation function of the current picture with respect to orientation, calculated using samples taken on 3 rings with radii 40, 50 and 60.

Description

ocf rotates the two source pictures (**from** and **with**) about their origins, tabulating the cross-correlation coefficients between sets of samples. These sample sets are taken on 5 rings with radii stretching from one quarter to three quarters of the distance to the nearest picture edge. **ocf** returns the angle (in radians) giving the highest correlation level in the variable *theta*. If you specify an output picture as in the last command example, the correlation function is stored as a 1-D *Correlation* picture.

ocf

To register pictures that differ in position as well as orientation, you can eliminate the unknown displacements by considering power spectra (as in the second example) or auto-correlation functions, which are position independent. They are also centro-symmetric (implying an orientational ambiguity of 180 degrees). By default, **ocf** uses semi-circular rather than full circular ring samples . For registering other kinds of data (for example, pairs of images with an identifiable common point) use the **full** option.

A picture with fine detail has a spectrum that extends further out than one with largely coarse detail, and an auto-correlation function that shows the opposite behaviour. You select one or the other according to your application, and can also control the radii at which samples are taken using the **radius** key. If your pictures are noisy, you may need to increase the number of rings that **ocf** compares using the **rings** key.

If you specify a display with the **mark** key, **ocf** marks the circular ring samples on the display. For details of the **mark** key, refer to *Appendix C, Semper Keys and Options.*

Use the **verify** option to send information about the correlation process to the console.

Notes

display marking:	sample rings used
multi-layer pictures:	faulted
forms used internally:	fp, complex
variables set:	*theta* (angle, in radians, by which picture must be rotated clockwise to match the source picture)

Defaults and Ranges

keys/options	defaults	range
[from]	current picture, held in the variable *select*	valid picture number
with	*none*	valid picture number
to	*none*	valid picture number
rings	5 ring sections	positive integer
radius	one and three quarters of the distance to the nearest picture edge	real number
mark	mark off	see *Appendix C*
full	semi-circular rings	
verify	verification off	