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Subject: The Behavior of CONVOL

Posted by [Kevin R. Turpie](#) on Thu, 31 Oct 1996 08:00:00 GMT

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I've found the behavior of CONVOL to be a bit confusing. Please let me know if I'm missing something, but here are my observations:

First, CONVOL does not appear to perform a convolution by default; rather it seems to do a correlation. They are similar, but give different results if the kernel is asymmetric.

Second, when CENTER is set to 0, CONVOL does a convolution in a strict sense \*if\* the input kernel function, say  $k(x)$ , is defined so that  $k(x) = 0$  for all  $x < 0$ . The result is usually shifted to the right.

To do a true convolution with CONVOL for any kernel, it seems that CENTER must be set to 1 and REVERSE must be applied to each dimension of the kernel prior to input.

I spoke with RSI Tech Support about this last February and they felt the solution would be to more clearly explain CONVOL in future releases of the RG. Hmmmm. Anyway, try it out and see if you get the same results.

Thanks,

Kevin

PS - If your interested, I did create a routine to perform two dimensional convolutions using a FFT. It is \*very\* fast and behaves like CONVOL with the EDGE\_WRAP keyword on and the kernel oriented properly.

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Subject: Re: The Behavior of CONVOL

Posted by [Christian Soeller](#) on Mon, 04 Nov 1996 08:00:00 GMT

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"Kevin R. Turpie" <[turpie@seaeagle.gsfc.nasa.gov](mailto:turpie@seaeagle.gsfc.nasa.gov)> writes:

> I'm afraid you missed the point; normalization doesn't have anything  
> to do with it. It is the orientation of the kernel. In a convolution  
> the kernel "flipped" wrt to the function being convolved. In a  
> correlation is is not. With CENTER=1 (default), CONVOL uses the same  
> orientation as a correlation. With CENTER=0, it does not.

Your observation is correct. If you want to have the normal convolution

behaviour you have to replace your kernel  $k(u)$  by  $k(-u)$  (here assuming a centered notation). I came across it when doing deconvolutions. Something to watch out for when using nonsymmetric kernels.

If it is not yet in the FAQ it should definitely go there.

Best regards,

Christian

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