Subject: Re: Local max filter
Posted by Craig Markwardt on Tue, 21 Aug 2001 21:09:16 GMT
View Forum Message <> Reply to Message

rkj@dukebar.crml.uab.edu (R. Kyle Justice) writes:
> I am trying to implement a local max filter
> without loops. Has this been done?
>
> (Given an array and a filter width, return an
> array containing the array value if it is
> a local max, 0 if not)
>
> For instance,
>
> 3 4 7 2 6 4 9 8 3
>
> would be
>
> 0 0 7 0 0 0 9 0 0
>
> for a width of 5.

JD and I had a contest doing this kind of thing -- finding maxima -- a year or so ago. Of course I popped his socks off, but he will tell you a different story :-)

Perhaps the easiest way to do this is with a bunch of vector compares.

```
arr = [3, 4, 7, 2, 6, 4, 9, 8, 3]  ;; Initial data
arr2 = arr(2:*)                    ;; Center points
b = (arr2 GE arr(0:*)) AND (arr2 GE arr(1:*)) AND $
    (arr2 GE arr(3:*)) AND (arr2 GE arr(4:*))  ;; Compare against neighbors
result = [0, 0, b*arr2, 0, 0]  ;; Replace boundaries
```

The trick is that you are comparing arr(2:*) to each of its neighbors. I am using the little trick I've published a couple of times, which is that when two vectors of unequal lengths are compared, the longer one is truncated to the other one's size. Otherwise you need to do "arr2 GE arr(0:n_elements(arr)-2)" and so on.

If you really need variable widths then the above can be formulated into a loop over the width. This is not a hurtful loop because the arrays are still compared vectorially. Try this function out:

```
function locmax, arr, width
  if n_elements(arr) LT width then message, 'ERROR: arr is too small'
  if (width MOD 2) EQ 0 then       message, 'ERROR: width must be odd'
  ic = (width-1)/2
```

```
  arrc = arr(ic:*)
  b = bytarr(n_elements(arr)-width+1) + 1b
  for i = 1, ic do $
    b = b AND (arrc GE arr(ic-i:*)) AND (arrc GE arr(ic+i:*))
  return, [arr(0:ic-1)*0, b*arrc, arr(0:ic-1)*0]
end
```

I play the same tricks, plus a few tricks to preserve the type of the original array.

Craig

--

 -- --------------
Craig B. Markwardt, Ph.D. EMAIL: craigmnet@cow.physics.wisc.edu
Astrophysics, IDL, Finance, Derivatives | Remove "net" for better response
 -- --------------