Subject: algorithm question. Can I get rid of the for loop?
Posted by Søren Frimann on Thu, 21 Mar 2013 21:32:15 GMT
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Hi All.

I have an implementation of a hampel filter (see e.g. http://exploringdatablog.blogspot.dk/2012/01/moving-window-f ilters-and-pracma.html) in IDL.

My implementation looks like this:

```
################################################
FUNCTION hampel, x, y, dx, THRESHOLD=threshold

Compile_Opt idl2

IF N_Elements(threshold) EQ 0 THEN $
  threshold = 3

;initialize arrays
s0 = FltArr(N_Elements(y))
y0 = FltArr(N_Elements(y))
yy = y

FOR i=0,N_Elements(y)-1 DO BEGIN
  index = Where((x GE x[i] - dx) AND (x LE x[i] + dx))
  y0[i] = Median(y[index]) ; Median filtering
  s0[i] = 1.4826*Median(Abs(y[index] - y0[i])) ;estimating uncertainty
ENDFOR

ol = Where(Abs(y - y0) GE threshold*s0)  ;Index of outliers
yy[ol] = y0[ol]

result = Create_Struct('y',yy, $
                       'sigma',s0)

RETURN, result

END
################################################
```

the filter runs a moving window of width 2*dx measured in the same units as x.
x is generally not uniformly spaced (so there's not a constant number of points inside the window as it moves).
x and y can be quite long vectors so the filter takes a long time to run.
Can anyone see any method for speeding the code up?
Any help would be much appreciated!

Cheers,
Søren