Subject: Re: MINIMUM DISTANCE BETWEEN TWO CURVES
Posted by promashkin on Fri, 23 Jun 2000 07:00:00 GMT
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Mark,
As far as I can tell from "f and g are unknown functions" and "Only know g and f by some points in 3D space", it looks to me that you are trying to find the closest points of two FLTARR(x, 3) arrays (or similar XYZ description) in 3D coordinates. Will a simple method like this work for you?

```
; Make fake data that are not a line
x = findgen(1000)
x = [[x], [x], [x]]
x[*, 0] = x[*, 0]+20*sin(x[*, 0]*0.05)+randomu(seed, 1000)*10
x[*, 1] = x[*, 1]+25*sin(x[*, 0]*0.02)+randomu(seed, 1000)*5
x[*, 2] = x[*, 1]+28*sin(x[*, 0]*0.1)+randomu(seed, 1000)*20
y = x^1.5 * 0.75
; X and Y are the two curves A and B that you mention.
;Lets try to execute the following on them:

function test, x, y, min_delta=min_delta
start = systime(1)
min_delta = sqrt((x[0, 0] - y[0, 0])^2+(x[0, 1] - y[0, 1])^2+(x[0, 2] -
y[0, 2])^2)
loc = 0
for i=0, n_elements(x)/3-1 do begin
 delta_x = x[i, 0] - y[*, 0]
 delta_y = x[i, 1] - y[*, 1]
 delta_z = x[i, 2] - y[*, 2]
 delta = sqrt(delta_x^2+delta_y^2+delta_z^2)
 temp = min(delta, /nan)
 if temp le min_delta then begin
  min_delta = temp
  loc = i
 endif
endfor
print, "Finished in", systime(1)-start, ' s'
return, loc
end

IDL> print, test(x, y)
Finished in      0.61666667 s
     338
```

Min_delta can be retrieved via keyword. The loop is slow, sorry. I am sure one of the Pros would be able to speed it up with Histogram :-)
Hope this helps.
Cheers,

Pavel

"Mark C." wrote:
>
> Given:
> a=f(x,y,z) and b=g(x,y,z), both a and b are separate curves. (Not straight
> lines. Nor do they loop over themselves). f and g are unknown functions.
> Only know g and f by some points in 3D space. Points are irregularly spaced.
>
> Objective:
> Find the minimum distance between a and b. Give the coordinate where this
> minimum occurs in term of the nearest point on a and the nearest point on b.
>
> Needs help:
> Does anyone have a routine to do such calculation using IDL? Any other
> suggestions appreciated.
>
> Thanks in advance,
> Mark Chan
