Subject: Re: point inside/outside of 3D object.
Posted by Karl[1] on Tue, 21 Jun 2011 15:18:02 GMT
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On Jun 21, 3:24 am, Wox <s...@nomail.com> wrote:
> On Sat, 18 Jun 2011 11:34:42 -0700 (PDT), Junum <junshi...@gmail.com>
> wrote:
>
>> Thanks Karl.
>> I wanted know whether IDLanROI::ContainsPoints can be applied to 3D
>> case.
>
> I'd guess the answer is no. You should implement this yourself (as
> Karl suggested) or you could do something like below. I'm not sure
> whether this is the best way, but it seems to work.
>
> ; Generate vertices
> v=TetrahedronVertices(r=10,phideg=-20)
>
> ; Connectivity list: [n,i[0],...,i[n-1],n,j[0],...,j[n-1],...]
> ; n: number of vertices for each face
> ; i[0],...,i[n-1]: vertices for face 1, ordered so that the normal
> ; points outwards (right-hand rule)
> ; j[0],...,j[n-1]: vertices for face 2, ordered so that the normal
> ; points outwards (right-hand rule)
> conn=[3,0,3,1, 3,0,1,2, 3,0,2,3, 3,1,3,2]
>
> ; Remark: if the number of vertices > 4 then you could generate
> ; the list like this:
> ;Qhull, v, tr, /delaunay
> ;conn=tetra_surface(v, tr)
>
> ; Point
> p=[0,0,0.]
>
> ; Volume of the polyhedron
> volume=tetra_volume(v,conn)
>
> ; Expanded polyhedron (including your point)
> ; vertices and connectivity list
> v2=[[v],[p]]
> Qhull, v2, tr, /delaunay
> conn2=tetra_surface(v2, tr)
>
> ; Volume of the expanded polyhedron
> volumeexp=tetra_volume(v2,conn2)
>
> ; If the "expanded volume" is larger, the point lies outside

> if volumeexp gt volume then print,'Exterior' else print,'Interior'

>> I wanted know whether IDLanROI::ContainsPoints can be applied to 3D
>> case.
>
> I'd guess the answer is no.

Right. Although not explicitly stated, I think that most of the anROI support is for 2D ROI's even though you can specify points in 3D space. The ROI's were intended for image analysis, I think. I understand that ROI's can be 1D and 3D as well, but I think that the algorithms in anROI are intended for 2D. Note that there are methods to compute such things as area and perimeter, but not volume and surface area. I also recall that some of the anROI algorithms will go ahead and try to do things like compute areas for non-planar ROI's even though the result may be questionable. Other algorithms might actually go ahead and do a planarity check and throw an error if the data wasn't planar.

The expanding polyhedron approach is clever! I like it.
