Subject: Re: calculating an 3d array from N-BODY data
Posted by J.D. Smith on Mon, 16 Feb 1998 08:00:00 GMT
View Forum Message <> Reply to Message

```
>  Hi:
>
>  I am trying to visualize data in 3D. I have it in the form of "x,y,x,mass" for
>  each particle. Does anyone have a routine to create an array M(x,y,z) from this
>  data ? The only methods I have come with are not very efficient.
>
>  Thank you very much.
>
>         I~nigo.
>  --
```

I assume you've read in x,y,z,mass...

```
..*************************************************
'''
M=fltarr(nx,ny,nz)

;;rescale x,y,z onto [0...n[xyz]-1]
;;or maybe x,y,z onto [0....max(n[x,y,z])-1] (preserves aspect)
minx=min(x,max=maxx)
x=round(float(x-minx)/(maxx-minx)*(nx-1))
...
...
ind=nx*ny*z+nx*y+x & M(ind)=mass
..*************************************************
'''
```

That should do it.

Note that in this case for any points which fall in the same voxel (3d
pixel, of which there are nx*ny*nz), the *last* value in the list will
be used. This would be the case for non-uniform points (e.g. not on
some kind of grid), or undersampled points (e.g. not enough voxels in
array to accomodate all the points). If you would prefer to *average*
overlapping values, you'll have to sort them all first, and set the
overlappers specially as an extra step, like this:

```
..*************************************************
'''
s=sort(ind)
ind=ind(s) & mass=mass(s)
u=[-1,uniq(ind)] ; u is sorted ... which we take advantage of...
del=u-shift(u,1)-1
wh=where(del gt 0,cnt) ; where the delta between adjacent uniq's is not
1
if cnt ne 0 then begin
```

```
 for i=0,cnt-1 do begin
  j=wh(i)
  M(ind(u(j)))=total(mass(u(j)-del(j):u(j)))/(del(j)+1.)
 enfor
endif
..**************************************************
'''
```

This is a slow loop, compared to the above calculation, but that doesn't
much matter if there are only a few (<10%, say) same-voxel points. You
should therefore choose each array dimension to be on the order of the
cube root of the number of points, if possible.

JD
--
J.D. Smith |*| WORK: (607) 255-5842
Cornell University Dept. of Astronomy |*| (607) 255-4083
206 Space Sciences Bldg. |*| FAX: (607) 255-5875
Ithaca, NY 14853 |*|