
Subject: Re: calculating an 3d array from N-BODY data
Posted by [J.D. Smith](#) on Mon, 16 Feb 1998 08:00:00 GMT
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> 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

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