```
clc;close all;clear;
```

取反矢量的给定距离约束的端点坐标解算方法

Kylin

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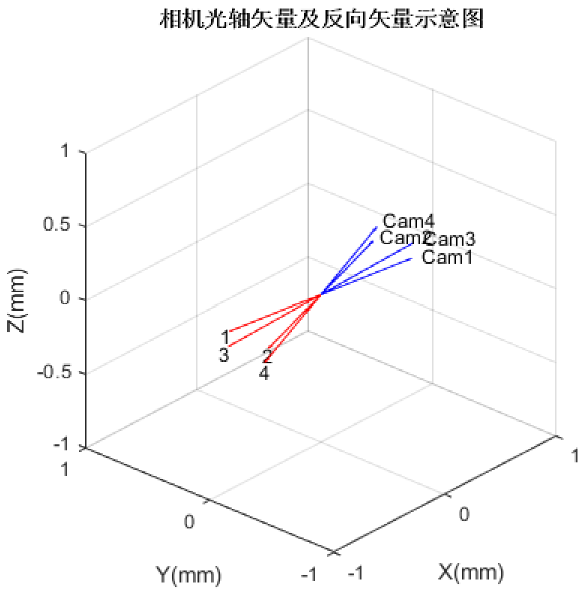
Step.1 导入相机星光定姿光轴矢量数据

```
camnum=4;%四台相机

A=[-0.00743315075508644 -0.8220695877598690.569338511915512
 -0.212031193941237 -0.6582266638849780.722343707487445
 0.0669664113878995 -0.7682612661275950.636624007333882
 -0.125489147751819 -0.6142386340366900.779078541774360];

o=[0,0,0];
for j=1:camnum
figure(1)

quiver3(o(1),o(1),o(1),A(j,1),A(j,2),A(j,3),'Color','b');hold on; axis equal;

view([-48.11 28.00])
title("相机光轴矢量及反向矢量示意图")
xlabel("X(mm)")
ylabel("Y(mm)")
zlabel("Z(mm)")
text(A(j,1),A(j,2),A(j,3),['Cam',num2str(j) ]);hold on;axis equal;
B=-A;%矢量取反

quiver3(o(1),o(1),o(1),B(j,1),B(j,2),B(j,3),'Color','r');hold on; axis equal;
text(B(j,1),B(j,2),B(j,3),[num2str(j) ]);hold on;axis equal;
xlim([-1 1])
ylim([-1 1])
zlim([-1 1])
end
```



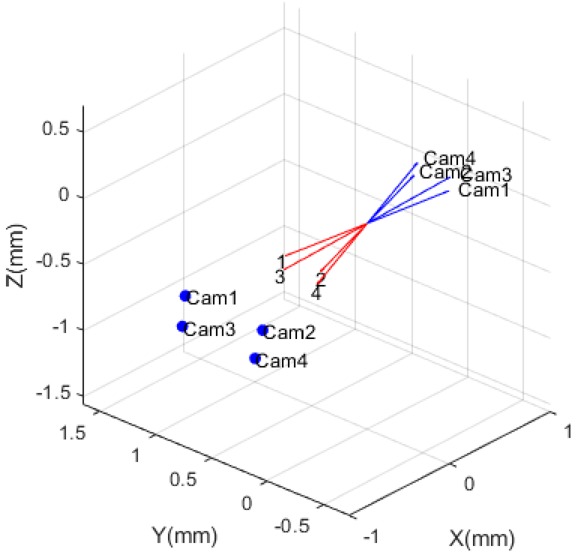
Step.2 点向式空间直线方程原理

```
% (x-x0)/m = (y-y0)/n = (z-z0)/p;
% (y-y0)/n = (z-z0)/p;
% (x-x0)/m = (y-y0)/n;
% (x-x0)/m = (z-z0)/p;
% sqrt(x^2+y^2+z^2)=Dis;
```

Step.3 点向式空间直线方程组解算

```
 for i=1:camnum
 syms x y z
 eqns = [x/B(i,1) == y/B(i,2), x/B(i,1) == z/B(i,3),y/B(i,2) ==
z/B(i,3),(x^2+y^2+z^2)^0.5==2];%方程生成及距离约束
 vars = [x y z];
 [x, y, z] = solve(eqns, vars);
 %==========保证解算向量的象限与所在矢量象限一致==========
 if x(1,1)*B(i,1)>0
     a=x(1,1);
 else
     a=x(2,1);
 end

 if y(1,1)*B(i,2)>0
     b=y(1,1);
 else
     b=y(2,1);
 end

 if z(1,1)*B(i,3)>0
     c=z(1,1);
 else
     c=z(2,1);
 end
 %=====================================================
 figure(1)
 plot3(a,b,c,'b.','Markersize',20);hold on;axis equal;
 text(a,b,c,['Cam',num2str(i) ]);hold on;axis equal;
 xlim([-1 1])
 % ylim([-2 2])
 % zlim([-2 2])
 end
```

相机光轴矢量及反向矢量示意图


Cam4
Cam2
Cam3
Cam1
Cam1
Cam3
Cam2
Cam4
Z(mm)
Y(mm)
X(mm)