

**Matlab程序：**

clear

%% 列x方向的平衡方程

% F\_R=10;

% F\_R+F\_NBC=0;

% F\_R+F\_NAB=20;

A=[ 1 0 0;

1 0 1;

1 1 0];

b=[10 0 20]';

F=A\b;

F\_R = F(1); % kN

F\_AB = F(2); % kN

F\_BC = F(3); % kN

%% 绘制轴力图

figure(1)

clf

F\_N = [0 F\_BC F\_BC F\_AB F\_AB 0];

x = [0 0 6 6 10 10];

% 绘制坐标轴

plot(x,F\_N ,'k');hold on

text(-1,0,'0');

text(-1,10,'10');

text(-1,-10,'-10');

text(0,-2,'C');

text(6,-2,'B');

text(10,-2,'A');

text(3,-5,'-');

text(8,5,'+');

axx=12;

ayy=max(F)\*2;

plot([0 0],[-ayy ayy],'k',[0 axx],[0 0],'k');hold on

% Draw arrows

ax=[axx+0.3,axx,axx; 0,0.3,-0.3];

fill(ax(1,:),ax(2,:),'k');

ay=[0,0.1,-0.1; ayy+0.6,ayy-0.4,ayy-0.4];

fill(ay(1,:),ay(2,:),'k');

text(0.2, ay(end)+0.2, 'F\_{N}(KN)', 'FontName','Times New Roman',...

'FontAngle','Italic','FontSize',12, 'HorizontalAlignment','left')

text(ax(1), -0.1, 'x','FontName','Times New Roman',...

'FontAngle','Italic','FontSize',18, 'VerticalAlignment','top')

axis off

%% 求A端的水平位移

% u\_A = Delta\_AC

% = Delta\_AB + Delta\_BC

% = (F\_AB\*L\_AB + F\_BC\*L\_BC)/(E\*A)

L\_AB = 0.4; % m

L\_BC = 0.6; % m

d = 10\*1e-3; % m

A = pi\*(d/2)^2; % m^2

E =200\*1e9; % Pa

u\_A = 1000\*(F\_AB\*L\_AB + F\_BC\*L\_BC)/(E\*A); % 单位：m

U\_A=['u\_A=' num2str(u\_A\*1e3) 'mm'];

disp('杆端A的水平位移为：')

disp(U\_A)

**输出结果：**

杆端A的水平位移为：

u\_A=-0.12732mm

**轴力图：**

