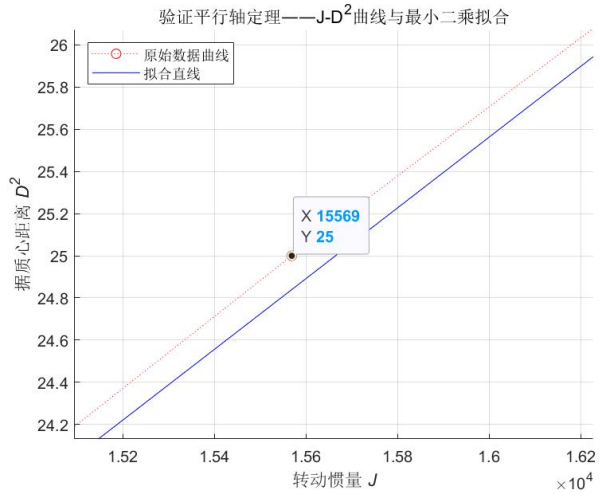
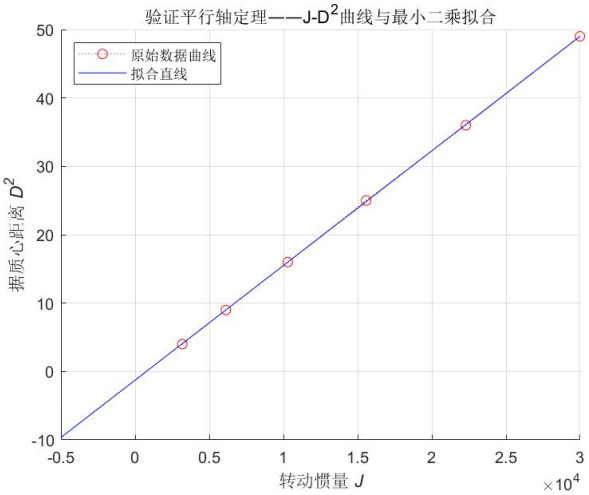
```
标准件的质量是618.52g,待测件的质量是627.94g
标准件的内径是 5.01cm,标准件的外径是 9.80cm
待测件的直径是 9.79cm,待测件转动惯量理论值是7521.20g·cm^2

带待测件的转动惯量测量结果:
   7195.66g·cm^2   7189.63g·cm^2   7183.91g·cm^2   7191.94g·cm^2   7185.14g·cm^2
带标准件的转动惯量是 9362.24g·cm^2,带待测件的转动惯量平均值是 7189.26g·cm^2,百分比误差是4.41%

待测圆柱的质量是310.68g,待测圆柱的直径是 3.41cm,其中两根圆柱在测量上完全一致故不做区分
待测圆柱的转动惯量测量结果:
2cm:   3178.08g·cm^2   3183.95g·cm^2   3184.41g·cm^2  平均值=3182.14g·cm^2,理论值=3388.59g·cm^2,百分比误差是6.09%
3cm:   6115.63g·cm^2   6112.85g·cm^2   6112.24g·cm^2  平均值=6113.57g·cm^2,理论值=6495.39g·cm^2,百分比误差是5.88%
4cm:  10291.41g·cm^2  10291.52g·cm^2  10280.25g·cm^2  平均值=10287.73g·cm^2,理论值=10844.91g·cm^2,百分比误差是5.14%
5cm:  15580.66g·cm^2  15569.25g·cm^2  15556.97g·cm^2  平均值=15568.96g·cm^2,理论值=16437.15g·cm^2,百分比误差是5.28%
6cm:  22305.78g·cm^2  22296.19g·cm^2  22267.62g·cm^2  平均值=22289.86g·cm^2,理论值=23272.11g·cm^2,百分比误差是4.22%
7cm:  30005.19g·cm^2  29989.74g·cm^2  29955.55g·cm^2  平均值=29983.49g·cm^2,理论值=31349.79g·cm^2,百分比误差是4.36%
拟合直线函数表达式为y=0.0017x-1.2591
```






```
function [a,b]=LeastSquares_Line(x,y)
    x1=sum(x);      y1=sum(y);
    x2=sum(x.^2);    x1y1=sum(x.*y);
    n=length(x);
    a=(n*x1y1-x1*y1)/(n*x2-x1*x1);
    b=(y1-a*x1)/n;
end
```

```
hold on;
figure(1);
%subplot(1,2,1);
plot(Average,Distance2,'o:r');
[k,b]=LeastSquares_Line(Average,Distance2);
fplot(@(x) k*x+b,'b');
grid;
xlabel('转动惯量 \it{J}');
ylabel('据质心距离 \it{D}^{2}');
legend('原始数据曲线','拟合直线','Location','northwest');
title('验证平行轴定理——J-D^{2}曲线与最小二乘拟合');
hold off;
fprintf('拟合直线函数表达式为y=%.4fx%.4f\n',k,b);
```

```
clc;clear;
format short
Ring_Rotational_Inertia=inline('1/2.*m.*(r1.^2+r2.^2)','m','r1','r2');
Column_Rotational_Inertia=inline('1/2.*m.*r.^2','m','r');
Calc_RotationalInertia=inline('(T2.^2-T0.^2)./(T1.^2-T0.^2).*StdI','T0','T1','T2','StdI');

stdm=618.52;                            unknownm=627.94;                          %g
d1=[5.010,5.008,5.010,4.998,5.004];     d2=[9.796,9.832,9.770,9.796,9.804];       %cm
Average_R1=sum(d1)/length(d1)/2;         Average_R2=sum(d2)/length(d2)/2;         %cm
dunknown=[9.796,9.790,9.786,9.786,9.786];                 %cm
Average_R=sum(dunknown)/length(dunknown)/2;               %cm
stdI=Ring_Rotational_Inertia(stdm,Average_R1,Average_R2);
unknownI_ideal=Column_Rotational_Inertia(unknownm,Average_R);
fprintf('标准件的质量是%4.2fg,待测件的质量是%4.2fg\n',stdm,unknownm);
fprintf('标准件的内径是%5.2fcm,标准件的外径是%5.2fcm\n',Average_R1*2,Average_R2*2);
fprintf('待测件的直径是%5.2fcm,待测件转动惯量理论值是%5.2fg·cm^2\n',Average_R*2,unknownI_ideal);

Period_Empty=[0.528927,0.528841,0.528744,0.528454,0.528841];          %s
Period1_Std=[0.699643,0.699682,0.699825,0.699679,0.699745];           %s
Period2_Unknown=[0.664051,0.663965,0.663966,0.663930,0.663940];       %s
unknownI=Calc_RotationalInertia(Period_Empty,Period1_Std,Period2_Unknown,stdI);
Average_unknownI=sum(unknownI)/length(unknownI);
fprintf("\n带待测件的转动惯量测量结果:\n");
fprintf('%10.2fg·cm^2',unknownI);
fprintf("\n带标准件的转动惯量是%8.2fg·cm^2,带待测件的转动惯量平均值是%8.2fg·cm^2,百分比误差是%.2f%%\n",...
stdI,Average_unknownI,abs(Average_unknownI-unknownI_ideal)/unknownI_ideal*100);
```