MATLAB 作业4

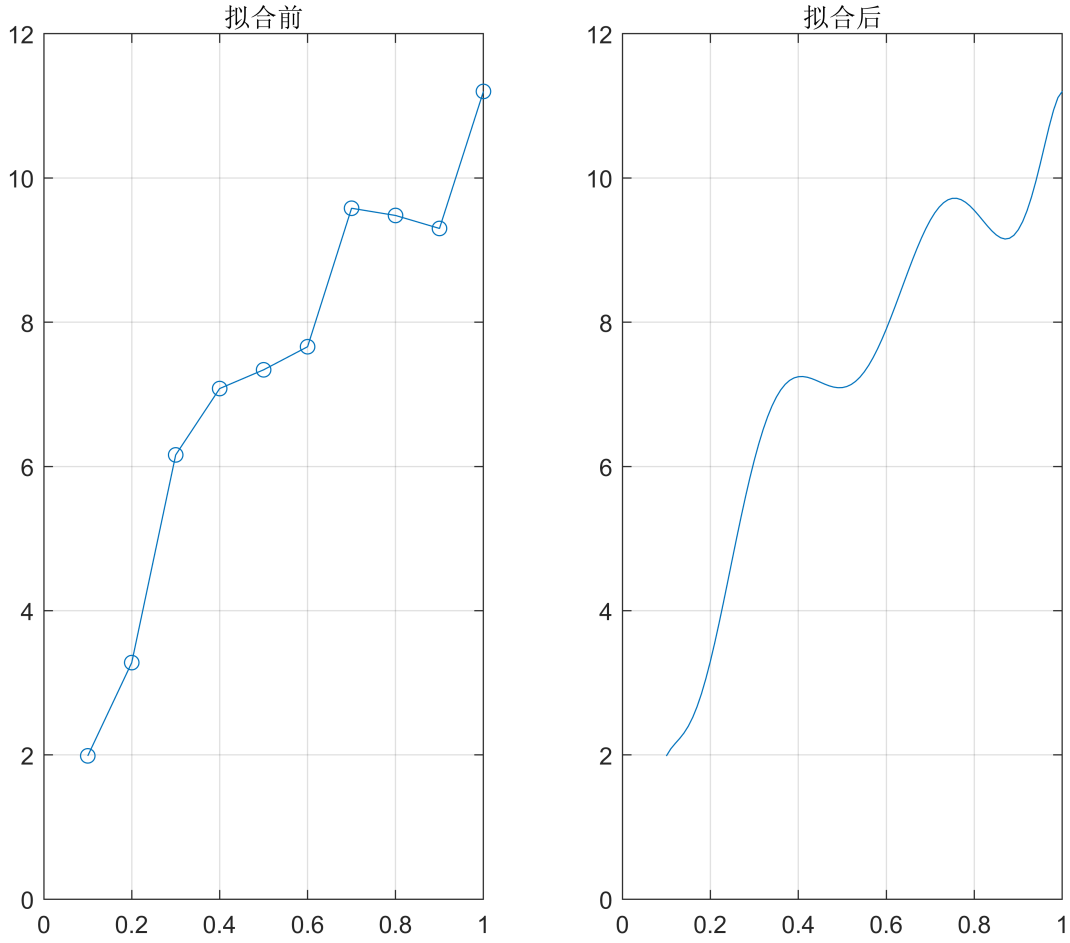
Problem1 输出

```
>> Problem1
两个多项式的和为
     6     9     9     0     8    12

两个多项式的商为:
    -3     6   -25

两个多项式的余式为:
     0     0     0  -144   -52   156
```

Problem2 输出

```
>> Problem2
线性插值得到的函数值为 0.495553
三次样条插值得到的函数值为 0.495561
```

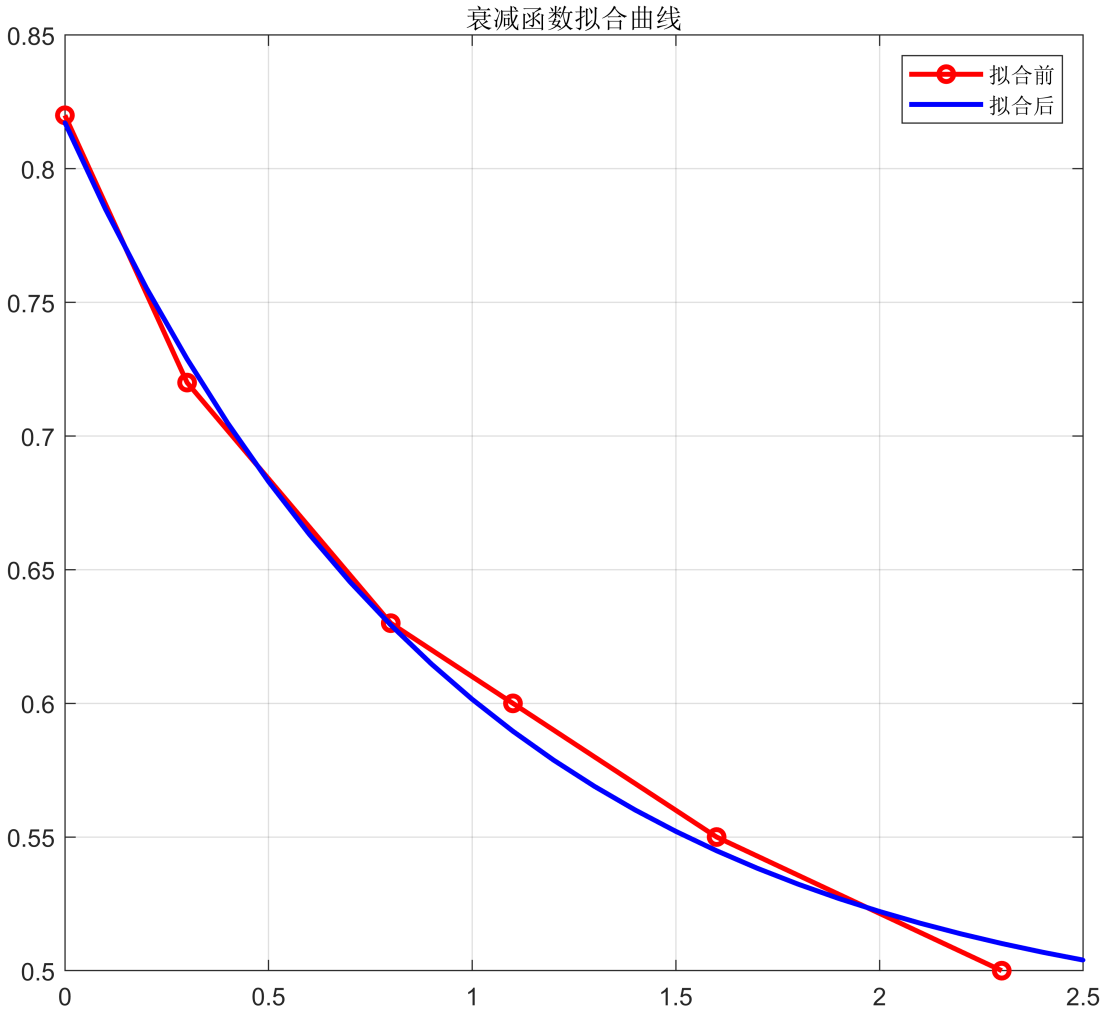
Problem3 图形



Problem4 图形及输出

代码可输出拟合后的函数表达式及其曲线：

```
>> Problem4

Local minimum found.

Optimization completed because the size of the gradient is less than
the value of the optimality tolerance.

<stopping criteria details>
衰减曲线的表达式为 y = 0.47595 + 0.34132 * exp(-x)
>>
```



Problem 1

```
F1 = [3, 0, 1, 2];
F2 = [2, 3, 3];
F = conv(F1, F2);
G1 = [-2, -1, 2];
G2 = [1, 3];
G = conv(G1, G2);
G_real = [0, 0, G];

ans_1 = F + G_real;
disp("两个多项式的和为");
disp(ans_1);

[Q, r] = deconv(F, G);
disp("两个多项式的商为：");
disp(Q);
disp("两个多项式的余式为：");
disp(r);
```

Problem 2

```
x = [0.46, 0.47, 0.48, 0.49];
y = [0.4846555, 0.4937542, 0.5027498, 0.5116683];
x1 = 0.472;
y1 = interp1(x, y, x1, 'linear');
y2 = interp1(x, y, x1, 'spline');

disp(['线性插值得到的函数值为 ' num2str(y1, '%0.6f')]);
disp(['三次样条插值得到的函数值为 ' num2str(y2, '%0.6f')]);
```

Problem 3

```
xi = 0.1:0.1:1;
yi = [1.987, 3.28, 6.16, 7.08, 7.34, 7.66, 9.58, 9.48, 9.30, 11.2];

coefficient = polyfit(xi, yi, 8);
x = 0.1:0.01:1;
fitted_poly = polyval(coefficient, x);

subplot(1,2,1);
plot(xi,yi,'o-');
subtitle('拟合前');
grid on;

subplot(1,2,2);
plot(x,fitted_poly,'-');
subtitle('拟合后');
grid on;
```

Problem 4

```
x = [0, 0.3, 0.8, 1.1, 1.6, 2.3];
y = [0.82, 0.72, 0.63, 0.60, 0.55, 0.50];

fh = @(c,x) c(1) + c(2) * exp(-x);
a = lsqcurvefit(fh, rand(1, 2), x, y);
x0 = 0:0.1:2.5;
y0 = fh(a, x0);
plot(x, y, 'ro-', x0, y0, 'b.-','LineWidth', 2);
legend('拟合前', '拟合后');
title('衰减函数拟合曲线');
grid on;
disp(['衰减曲线的表达式为 y = ' num2str(a(1)) ' + ' num2str(a(2)) ' * exp(-x)']);
```