

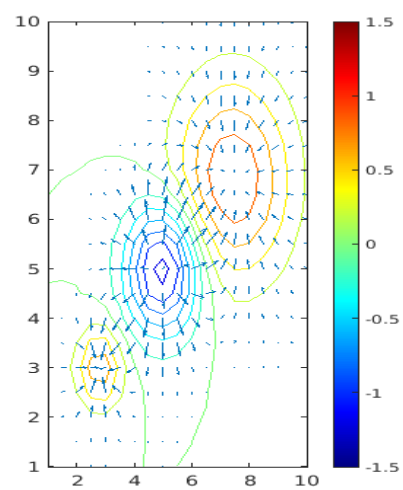
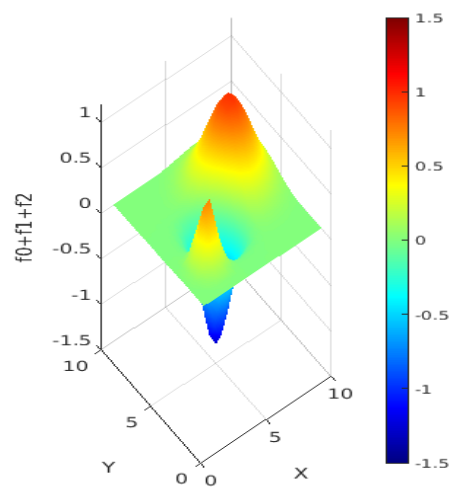
1.

Mid_01.m

```
x = 1:0.5:10;
y = 1:0.5:10;
x0 = 2.8; y0 = 3.0; s0 = 0.8;
x1 = 7.4; y1 = 6.8; s1 = 2.0;
x2 = 5.0; y2 = 5.0; s2 = 1.3;
[X,Y] = meshgrid(x,y);
f0 = real(0.8*exp(-(X-x0).^2 - (Y-y0).^2) / s0^2));
f1 = real(1.0*exp(-(X-x1).^2 - (Y-y1).^2) / s1^2));
f2 = real(-1.4*exp(-(X-x2).^2 - (Y-y2).^2) / s2^2));
Z = f0+f1+f2;
subplot(1,2,1)
surf(X,Y,Z);
zlim([-1.5 1.2])
xlabel('X')
ylabel('Y')
zlabel('f0+f1+f2')

shading interp
colormap('jet')
colorbar
set(gca,'Clim',[-1.5,1.5]);
subplot(1,2,2)
contour(X,Y,Z);
colormap('jet')
hold on
[U,V] = gradient(Z,0.5,0.5);
quiver(X,Y,U,V);
colormap('jet')
colorbar
set(gca,'Clim',[-1.5,1.5])
```

plot



2.

Mid_02.m

```
timer1 = tic;
for index = 1:1000
    clear s
    s = 0;
    for x = 100:10100
        s = s+(log(x)-(x/1000)^2+0.08*x-0.2);
    end
end
fprintf('iteration:\t%f\n',toc(timer1)/1000);
clear
timer2 = tic;
for index = 1:1000
    clear s x
    x = 100:10100;
    s=sum(log(x)-(x./1000).^2+0.08*x-0.2);
end
fprintf('vectorization:\t%f\n',toc(timer2)/1000);
```

Output:

iteration: 0.000198
vectorization: 0.000086

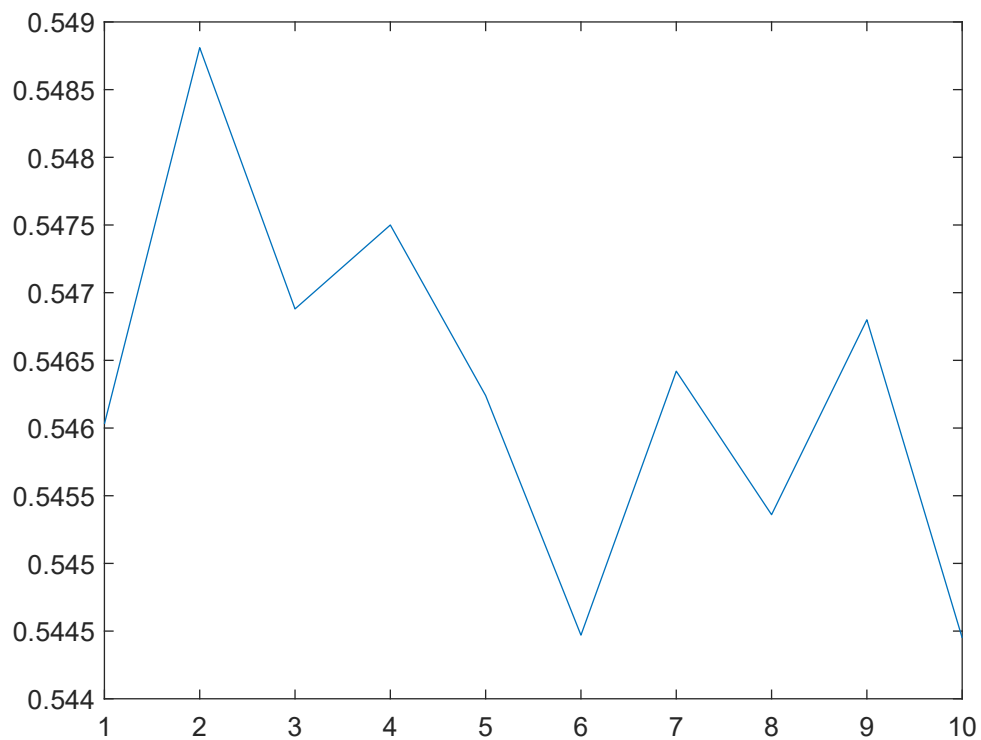
3.

Mid_03.m

```
s = zeros(1,10);
for t = 1:10
    for n = 1:100000
        x = rand;
        y = rand;
        if (4*(2*x-1)^4+8*(2*y-1)^8)<(1+2*(2*y-1)^3*(3*x-2)^2)
            s(t) = s(t)+1;
        end
    end
end

plot(1:10,s./100000);
avg_area = mean(s)/100000
```

plot



Output:

avg_area =

0.5463

4.

Mid_04.m

```
[T,S] = textread('input.dat','%n%n');
T = T';
S = S';
F1 = S;
plot(T, S,'k.')
hold on
F1(1) = (S(2)+S(3)+S(4)+S(5))/4;
F1(2) = (S(1)+S(3)+S(4)+S(5))/4;
F1(199) = (S(196)+S(197)+S(198)+S(200))/4;
F1(200) = (S(196)+S(197)+S(198)+S(199))/4;
for index = 3:198
    F1(index) = (F1(index-2)+F1(index-1)+F1(index+1)+F1(index+2))/4;
end
plot(T, F1,'rs')
F2=F1;
F2(1) = (F1(2)+F1(3)+F1(4)+F1(5))/4;
F2(2) = (F1(1)+F1(3)+F1(4)+F1(5))/4;
F2(199) = (F1(196)+F1(197)+F1(198)+F1(200))/4;
F2(200) = (F1(196)+F1(197)+F1(198)+F1(199))/4;
for index = 3:198
    F2(index) = (F2(index-2)+F2(index-1)+F2(index+1)+F2(index+2))/4;
end
plot(T, F2,'go')
F3=F2;
F3(1) = (F2(2)+F2(3)+F2(4)+F2(5))/4;
F3(2) = (F2(1)+F2(3)+F2(4)+F2(5))/4;
F3(199) = (F2(196)+F2(197)+F2(198)+F2(200))/4;
F3(200) = (F2(196)+F2(197)+F2(198)+F2(199))/4;
for index = 3:198
    F3(index) = (F3(index-2)+F3(index-1)+F3(index+1)+F3(index+2))/4;
end
plot(T, F3,'b-')
hold off
grid on
xlabel('時間');
ylabel('振幅');
```

```
legend('原始','f1','f2','f3');
```

plot

