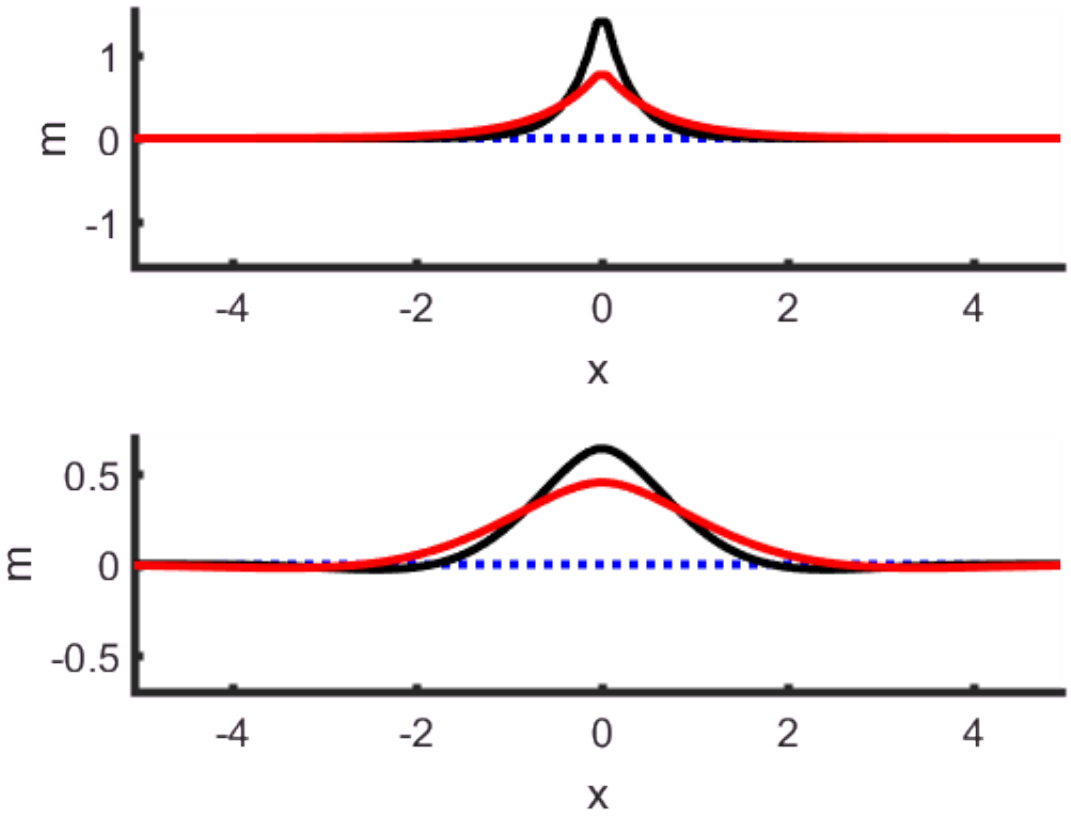
```
clear all;
% gda_3.10
% Examples of smoothing operators
% using the formula of Menke and Eilon (2015)
% supports Figure 3.12

clear all;

% auxially variable x
N=101;
Dx = 0.1;
xmin = -N*Dx/2;
x = xmin + Dx*[0:N-1]';

figure(1);
clf;

% plot minimum first-derivative smoothing operator
subplot(2,1,1);
set(gca,'LineWidth',3);
set(gca,'FontSize',14);
hold on;
ep = 0.3;
epi = 1/ep;
m1 = (epi/2)*exp(-epi*abs(x));
amp = max(abs(m1));
axis( [x(1), x(end), -1.1*amp, 1.1*amp ] );
plot( [x(1), x(end)]', [0,0]', 'b:', 'LineWidth', 3 );
plot( x, m1, 'k-', 'LineWidth', 3 );
ep = 0.6;
epi = 1/ep;
m1 = (epi/2)*exp(-epi*abs(x));
plot( x, m1, 'r-', 'LineWidth', 3 );
xlabel('x');
ylabel('m');

% plot minimum second-derivative smoothing operator
subplot(2,1,2);
set(gca,'LineWidth',3);
set(gca,'FontSize',14);
hold on;
ep = 0.3;
epi = 1/ep;
a = sqrt(2*ep);
V = (a^3)/(8*ep*ep);
m2 = V*exp(-abs(x)/a).*(cos(abs(x)/a)+sin(abs(x)/a));
amp = max(abs(m2));
axis( [x(1), x(end), -1.1*amp, 1.1*amp ] );
plot( [x(1), x(end)]', [0,0]', 'b:', 'LineWidth', 3 );
plot( x, m2, 'k-', 'LineWidth', 3 );
ep = 0.6;
epi = 1/ep;
a = sqrt(2*ep);
V = (a^3)/(8*ep*ep);
m2 = V*exp(-abs(x)/a).*(cos(abs(x)/a)+sin(abs(x)/a));
plot( x, m2, 'r-', 'LineWidth', 3 );
xlabel('x');
ylabel('m');
```




```
% Figure 3.12 Smoothing of a unit spike at x=0. (A) First derivative smoothing for ε=0.3 (black
% (red). (B) Second derivative smoothing for ε=0.3 (black) and 0.6 (red). MatLab script gda03_1
```