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% gda05_06
%
% examples of probability distribution p(m1,m2)
% unequal variance, uncorrelated
% Supports Figure 5.6

clear all;

% m1 variable
Nm1 = 51;
m1min = 0;
m1max = 5.0;
Dm1 = (m1max-m1min)/(Nm1-1);
m1 = m1min + Dm1*[0:Nm1-1]';

% m2 variable
Nm2 = 51;
m2min = 0;
m2max = 5.0;
Dm2 = (m2max-m2min)/(Nm2-1);
m2 = m2min + Dm2*[0:Nm2-1]';

% setup for distribution 1, C11<C22
P1=zeros(Nm1,Nm2);
mbar1 = [2.5, 2.5]';
sd1 = 0.5;
sd2 = 1.0;
C1 = diag( [sd1^2, sd2^2]' );
CI1 = inv(C1);
DC1 = det(C1);

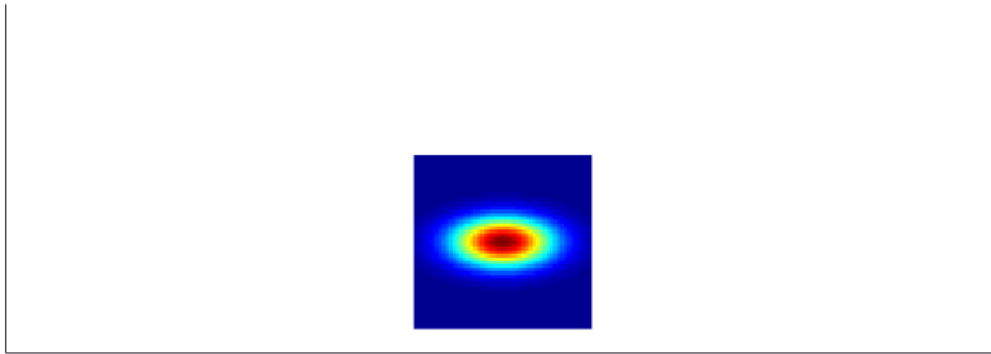
% normalization
norm1 = (1/(2*pi)) * (1/sqrt(DC1));

% build distribution
for i=[1:Nm1]
for j=[1:Nm2]
    x1=[m1(i), m2(j)]' - mbar1;
    P1(i,j) = norm1*exp( -0.5 * x1'*CI1* x1 );
end
end

% for test purposes
% A1 = Dd1*Dd2*sum(sum(P1));

gda_draw(' ', P1 );

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% Figure 5.6 Prior information about model parameters m1 and m2 represented with a  
% probability density function p(m1,m2). The model parameters are thought to be near  $\langle m \rangle$ , with  
% in m1 less than the uncertainty of m2. MatLab script gda05_06.
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