

Partial Solutions

(1)(a) $\mu = \pi/2, \sigma^2 = (\pi^2 - 8)/4$

(1)(b) Draw $(x, y = f(x))$, for $0 < x < \pi$.

(1)(c) Draw $(x, y = F(x))$, where $F(x) = (1 - \cos(x))/2$.

(2)(a) $f(x) = \frac{2}{\sqrt{2\pi}}e^{-2(x-3)^2}, \quad -\infty < x < \infty.$

(2)(c) $M_Z(t) = e^{t^2/2}.$

(2)(e) $M_W(t) = \frac{1}{\sqrt{1-2t}}.$

(2)(f) $M_V(t) = \exp[t^2].$

(2)(g) $V \sim N(0, 2).$

(2)(h) $f_V(x) = \frac{1}{2\sqrt{\pi}}e^{-x^2/4}, \quad -\infty < x < \infty.$

(3) (a) $e^{-0.5} - e^{-1.5}$, (b) $e^{-1.5}$, (c) $e^{-1.5} = P(X > 30)$

(4)(5)(6) %

% 4. Exponential Distribution

%

subplot(2,2,1)

X=0.1:0.1:12;

Ya=exppdf(X,1); Yb=exppdf(X,2); Yc=exppdf(X,4); Yd=exppdf(X,7);

plot(X,Ya,'r-',X,Yb,'g-',X,Yc,'b-',X,Yd,'m-'); %axis([0,12, 0,0.3])

legend('Exp(1)', 'Exp(2)', 'Exp(4)', 'Exp(7)')

title('(4) Exponential(\theta), \theta=1,2,4,7')

%

% 5. Chi-Square Distribution

%

subplot(2,2,2)

X=0.1:0.1:12;

Y1=chi2pdf(X,1); Y2=chi2pdf(X,2); Y4=chi2pdf(X,4); Y7=chi2pdf(X,7);

plot(X,Y1,'r-',X,Y2,'g-',X,Y4,'b-',X,Y7,'m-'); %axis([0,12, 0,0.3])

legend('\chi^2(1)', '\chi^2(2)', '\chi^2(4)', '\chi^2(7)')

title('(5) \chi^2(r), r=1,2,4,7')

%

% 6. Normal Distribution

%

subplot(2,2,3)

X7=-6:0.2:6; u=0; s1=1; s2=2; s3=2.5; s4=3;

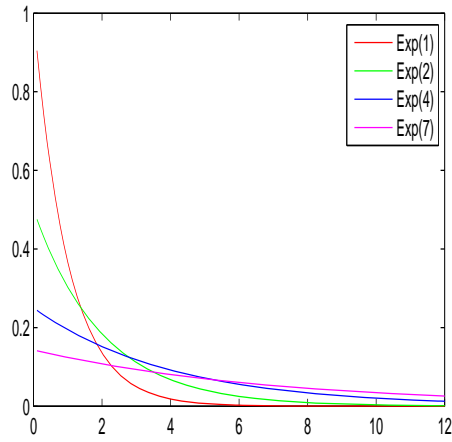
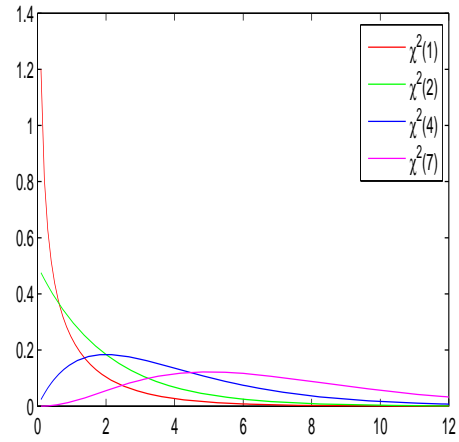
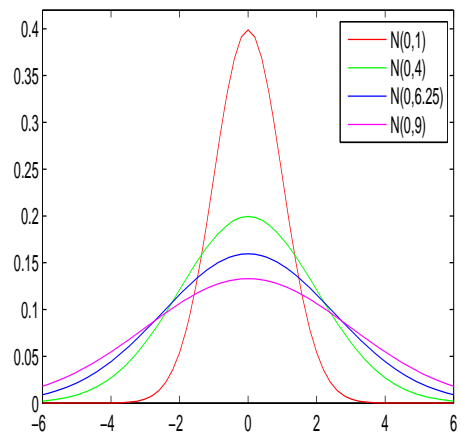
Y7a=normpdf(X7,u,s1); Y7b=normpdf(X7,u,s2); Y7c=normpdf(X7,u,s3);

Y7d=normpdf(X7,u,s4);

plot(X7,Y7a,'r-',X7,Y7b,'g-',X7,Y7c,'b-',X7,Y7d,'m-');axis([-6,6, 0,0.42])

legend('N(0,1)', 'N(0,4)', 'N(0,6.25)', 'N(0,9)')

title('(6) Normal Distribution: N(u,s^2)')

(4) Exponential(θ), $\theta=1,2,4,7$ (5) $\chi^2(t)$, $r=1,2,4,7$ (6) Normal Distribution: $N(\mu, \sigma^2)$ (7) $\Gamma(\alpha, \lambda)$ 