F14076083 魏湧致

6.20

(a) $z = \frac{9.5-8}{0.9} \approx 1.67$ P(X>9.5) = P(Z>1.67) = 1- P(Z<1.67) = 1-0.9525 = 0.0475

(b) $z = \frac{8.6-8}{0.9} \approx 0.67$ P(X≤8.6) = P(Z≤0.67) = 0.7486

(c) $z_1 = \frac{7.3-8}{0.9} \approx -0.78$ $z_2 = \frac{9.1-8}{0.9} \approx 1.22$

P(7.3<X<9.1) = P(-0.78<Z<1.22) = P(Z<1.22)-P(Z<-0.78)

=0.8888-0.2177 = 0.6711

6.28

μ = np = 100*0.72 = 72 $\sigma = \sqrt{npq} = \sqrt{100 * 0.72 * 0.28} \approx 4.49$

(a) $z = \frac{79.5-72}{4.49} \approx 1.67$ P(X≥80) = P(Z≥1.67) = 1- P(Z<1.67) = 1-0.9525 = 0.0475

(b) $z = \frac{68.5-72}{4.49} \approx -0.78$ $P(X \leq 68) = P(Z \leq -0.78) = 0.2177$

6.58

(a) Poisson distribution mean μ=5 P(X>10) = 1-P(X≤10) = 1-0.9863 = 0.0137

(b) gamma distribution mean β=1/5 α=10

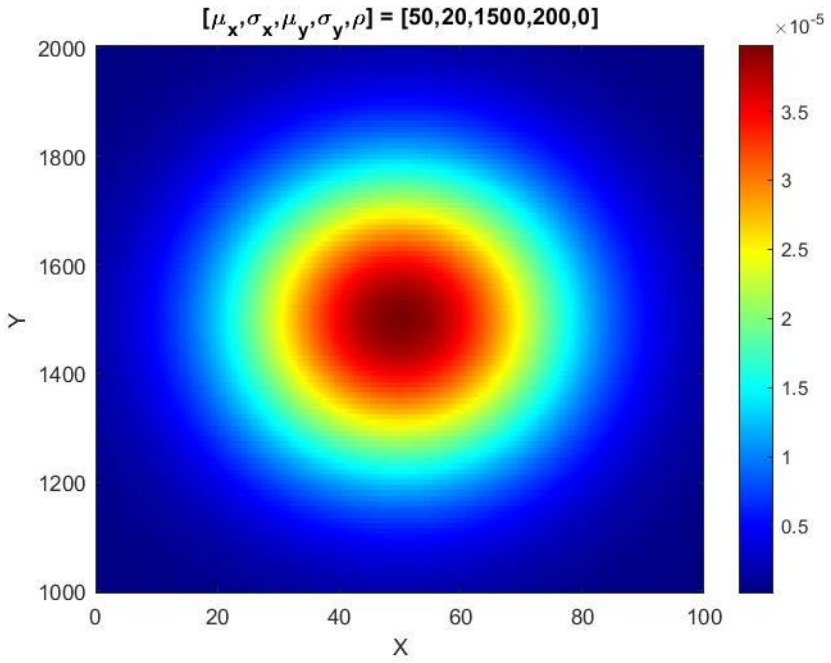
$P(X>2) = 1-P(X \leq 2) = 1-\int_0^2 \frac{5^{10}}{9!} x^9 e^{-5x}\, dx = 1-\int_0^{10} \frac{y^9 e^{-y}}{9!} dy$

= 1-0.5421 = 0.4579

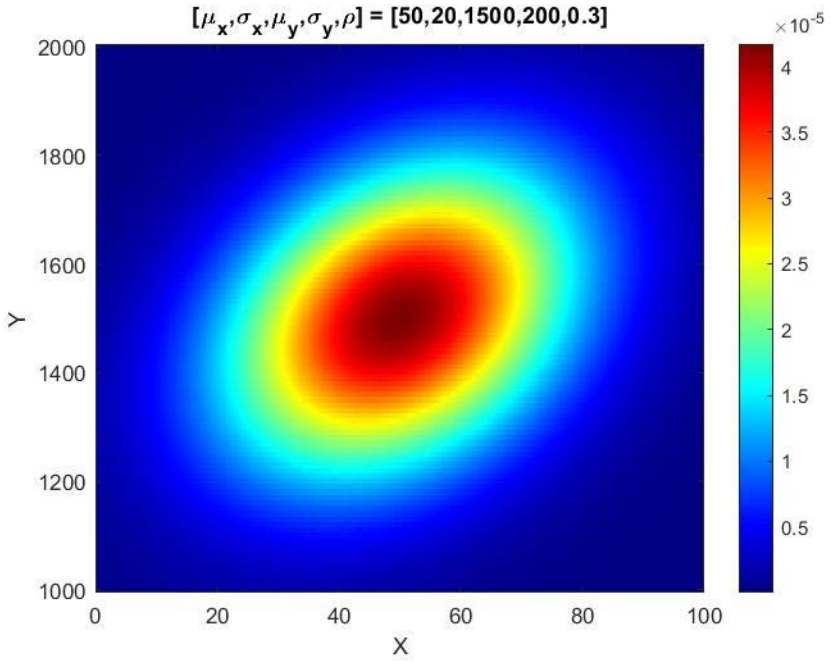
Matlab

1.a

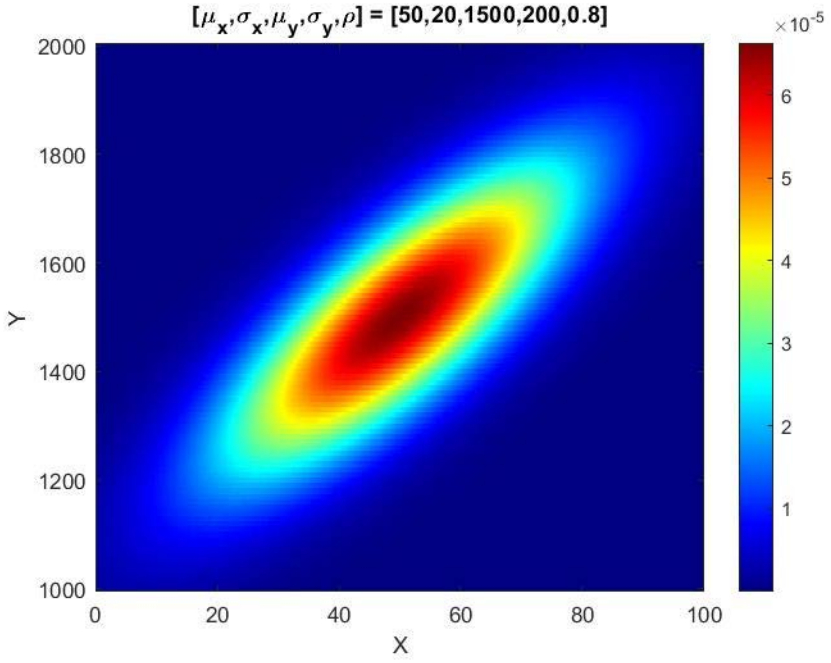
Distribution 1: μ_x, σ_x, μ_y, σ_y, ρ = [50, 20, 1500, 200, 0]



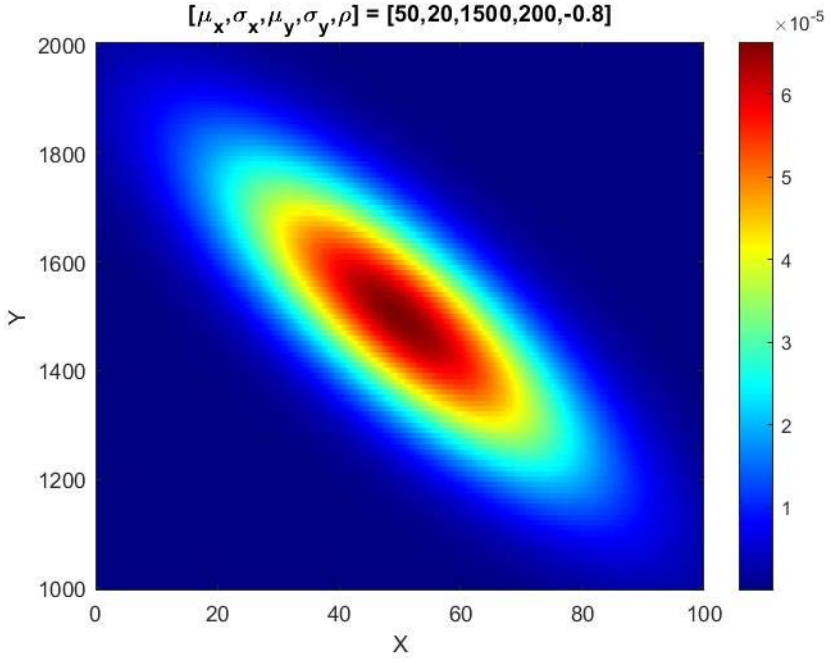
Distribution 2: μ_x, σ_x, μ_y, σ_y, ρ = [50, 20, 1500, 200, 0.3]



Distribution 3: μ_x, σ_x, μ_y, σ_y, ρ = [50, 20, 1500, 200, 0.8]



Distribution 4: μ_x, σ_x, μ_y, σ_y, ρ = [50, 20, 1500, 200,−0.8]



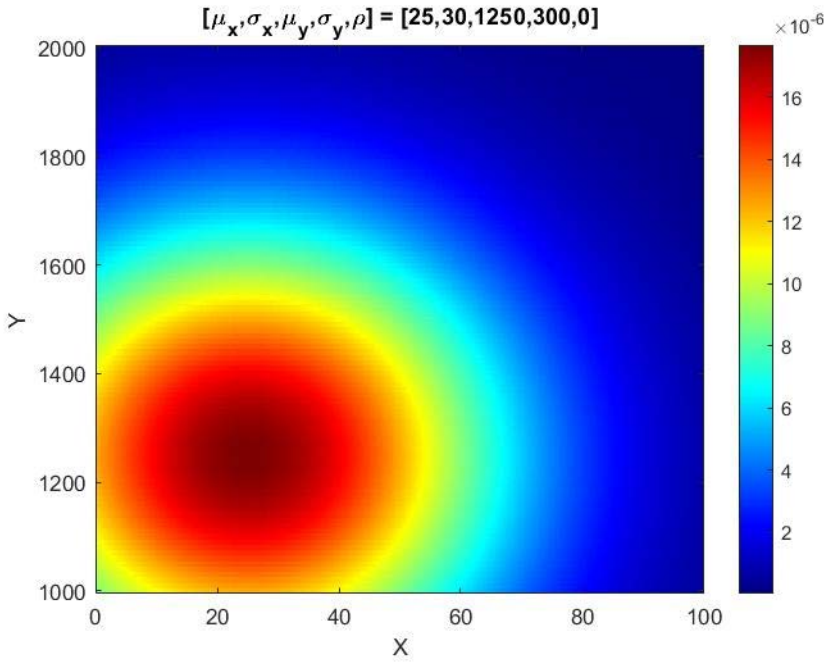
1.b

ρ為 0 時圖形以同心圓往外逐漸遞減，當ρ越來越大時，圖形會呈現左下右上的橢圓且會越來越扁，而ρ改為負數時會是將原本正數ρ的圖形左右對稱。

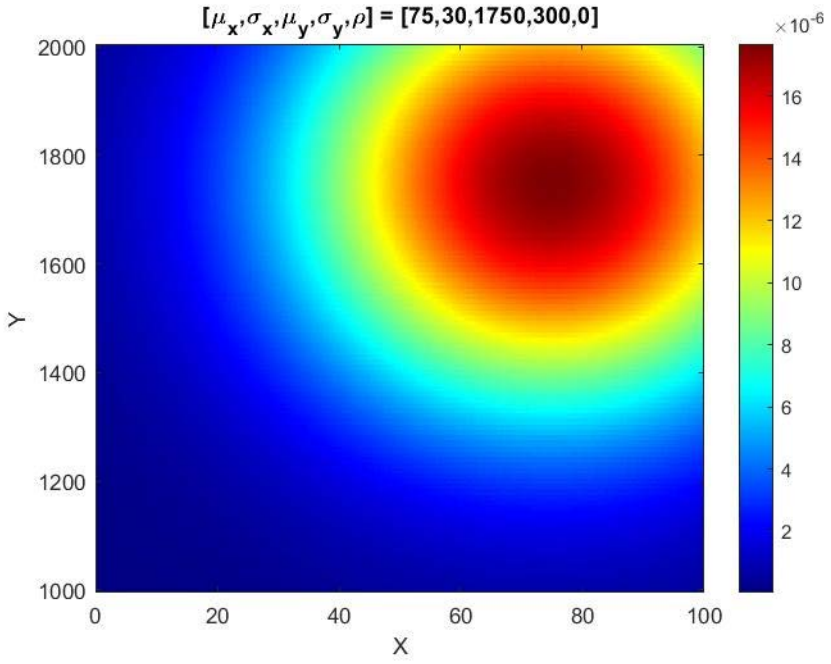
2.a

Case1:

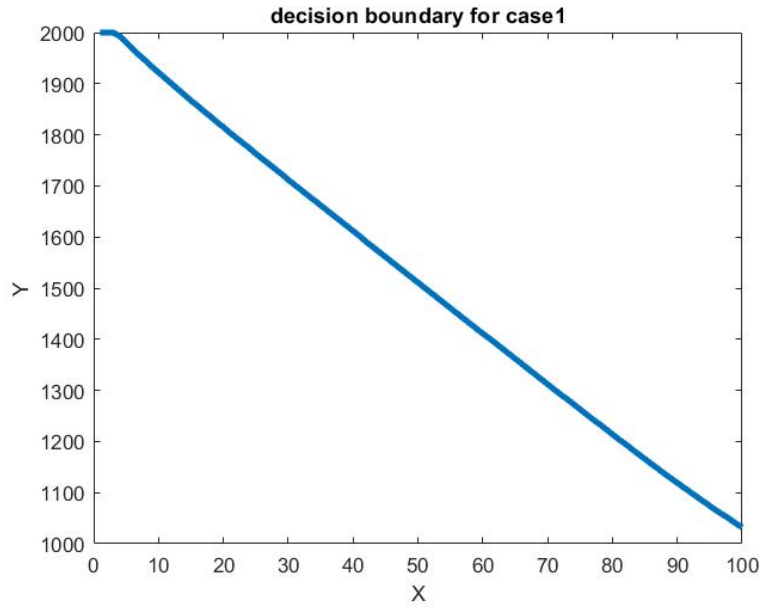
Distribution 1: μ_x, σ_x, μ_y, σ_y, ρ = [25, 30, 1250, 300, 0]



Distribution 2: μ_x, σ_x, μ_y, σ_y, ρ = [75, 30, 1750, 300, 0]

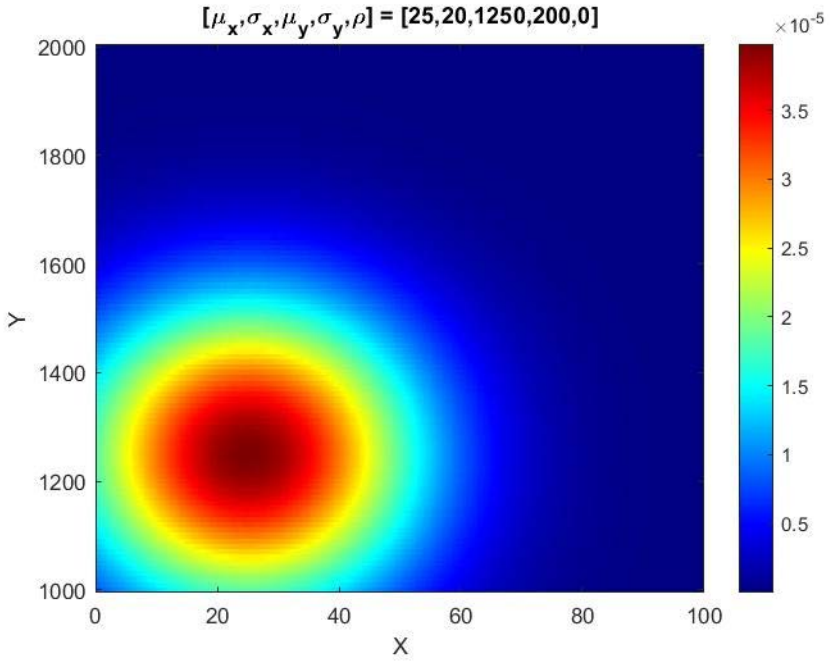


Decision boundary:

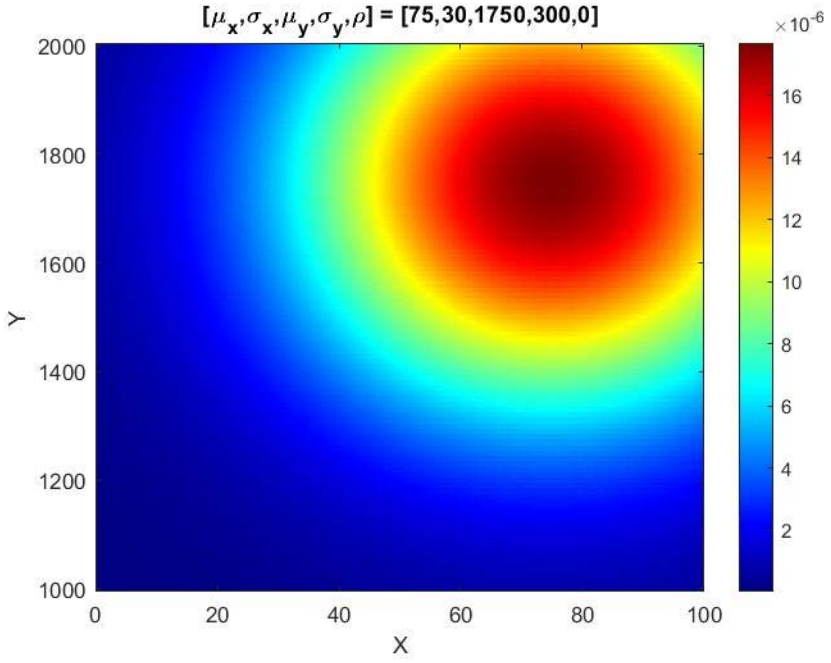


Case2

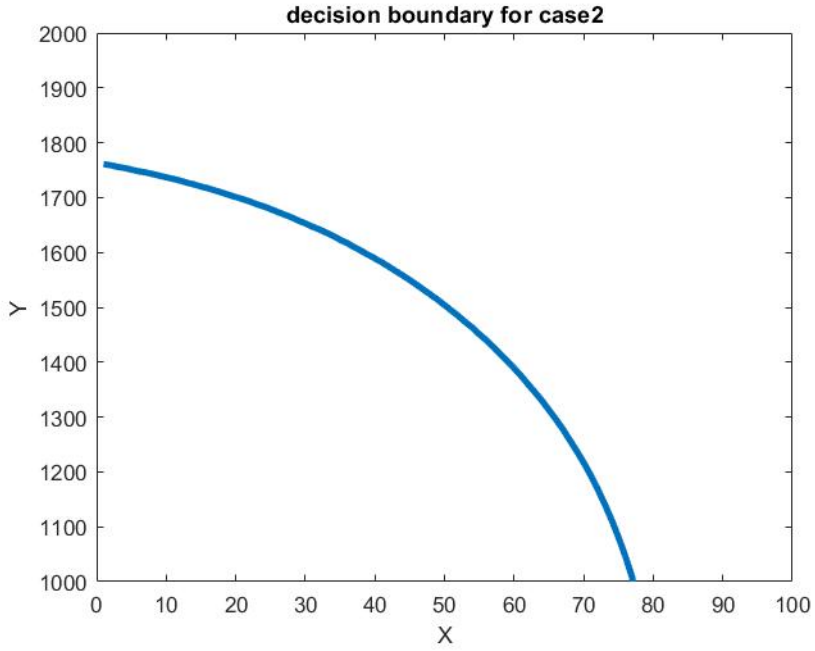
Distribution 1: μ_x, σ_x, μ_y, σ_y, ρ = [25, 20, 1250, 200, 0]



Distribution 2: μ_x, σ_x, μ_y, σ_y, ρ = [75, 30, 1750, 300, 0]



Decision boundary:



2.b

Case1 的兩個 distribution 只有平均值有改變且是對稱的，固圖形也相互對稱，所以 decision boundary 大約為左上到右下的斜直線。而 Case2 的兩個 distribution 不只有平均值改變，標準差也有變動，且 distribution1 的標準差比 distribution2 還要小，所以同心圓較小，故 decision boundary 是將 distribution1 包住的弧形。