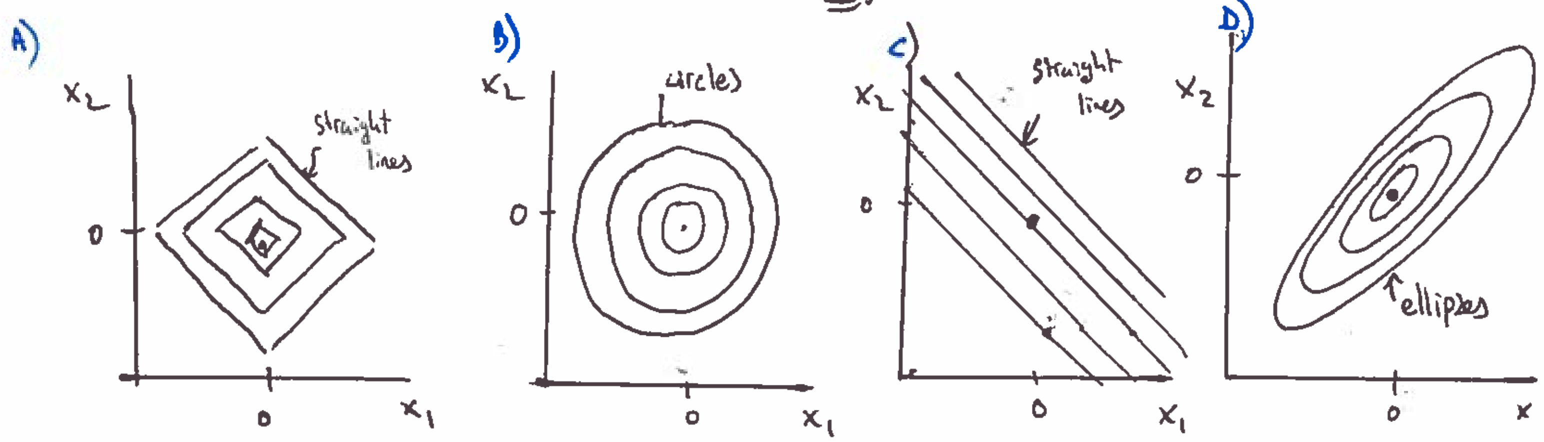
Q1

$$N(\underline{x}; \underline{\mu}, \underline{\underline{\Sigma}}) = \frac{1}{\det(2\pi\underline{\underline{\Sigma}})^{1/2}} e^{-\frac{1}{2}(\underline{x}-\underline{\mu})^T \Sigma^{-1} (\underline{x}-\underline{\mu})}$$



i) $e^{-|x_1| - |x_2|}$

ii) $e^{-\frac{1}{2}x_1^2 a - \frac{1}{2}x_2^2 a}$

iii) $e^{-\frac{1}{2}x_1^2 a - \frac{1}{2}x_2^2 b + x_1 x_2 c}$

iv) $e^{-\frac{1}{2}(y - x_1 - x_2)^2}$

In the context of regression why would distribution (i) be useful?

Q2

$$N(\underline{x};\underline{\mu},\underline{\underline{\Sigma}}) = \frac{1}{\det(2\pi\underline{\underline{\Sigma}})^{1/2}} e^{-\frac{1}{2}(\underline{x}-\underline{\mu})^T\Sigma^{-1}(\underline{x}-\underline{\mu})}$$

$$p(\underline{x}_1) = N(\underline{x}_1;\underline{0},\underline{\underline{\Sigma}}_1)$$

$$p(\underline{x}_2) = N(\underline{x}_2;\underline{0},\underline{\underline{\Sigma}}_2)$$

independent

$$\underline{y} = \underline{\underline{W}}\,\underline{x}_1 + \underline{x}_2$$

What is $p(\underline{y})$?

Q3

$$\mathcal{N}(\underline{x}; \underline{\mu}, \underline{\underline{\Sigma}}) = \frac{1}{\det(2\pi\underline{\underline{\Sigma}})^{1/2}} e^{-\frac{1}{2}(\underline{\mu}-\underline{x})^T \underline{\underline{\Sigma}}^{-1} (\underline{\mu}-\underline{x})}$$

$$q(\underline{x}; \underline{\lambda}, \underline{\underline{P}}) \propto e^{-\frac{1}{2}\underline{x}^T \underline{\underline{P}}\,\underline{x} + \underline{\lambda}^T \underline{x}}$$

$$q(\underline{x}; \underline{\lambda}, \underline{\underline{P}}) = \mathcal{N}(\underline{x}; \underline{\mu}_q, \underline{\underline{\Sigma}}_q)$$

what are $\underline{\mu}_q$ & $\underline{\underline{\Sigma}}_q$?