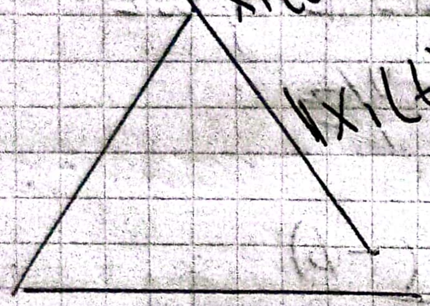
1) $P_{x_1-x_2}$ $\frac{1}{T}\int |x_1(t)-x_2(t)|^2\, dt = d(x_1,x_2)$

$P_{x_1-x_2} = P_{x_1} - \frac{2}{T} < x_1(t), x_2(t) > + P_{x_2}$

$P_x \int |x(t)| = ||x(t)||^2$



$x_1(t)$

$||x_1(t)+x_2(t)|| = d(x_1 x_2)$

$= \sqrt{(x_1(t)-x_2(t))^2}$

$||x_1(t)|| = \sqrt{\int |x_1(t)^2|\, t} = ||x_1(t)||^2 = \int |x_1(t)|^2 d$

$P_{x_1} - \frac{1}{T}\int |A e^{-jnw_0 t}|\, dt$

$= \frac{1}{T}\int (A e^{-jnw_0 t}(A e^{-jnw_0 t}))\, dt$

$= \frac{1}{T}\int A^2 e^{-jnw_0 t} e^{jnw_0 t}\, dt$

$|a| = \sqrt{Re^2 + Im^2} = \sqrt{a\, a^2}$

$P_{x_1} = \frac{1}{T}\int A^2 e^j (dt) = \frac{1}{T} A^2 \int dt = \frac{A^2}{T}(T-0) = A$

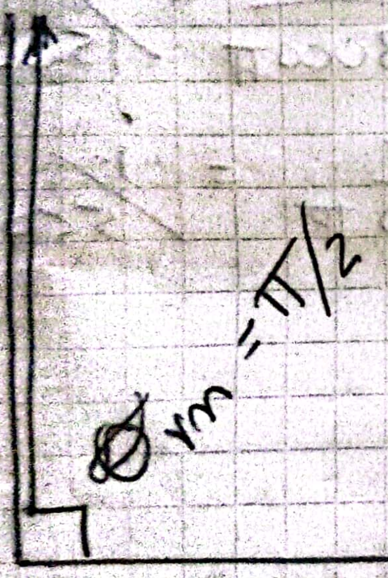
$P_{x_2} = B^2$

$-\frac{2}{T}\int A e^{-jnw_0 t} |B e^{jnw_0 t}|^2\, dt = -\frac{2}{T}\int AB e^{-jnw_0 t} e^{-jnw_0 t}\, dt$

$$\frac{-2}{T} AB \int_T e^{j(n-m)\omega_0 t}\, dt = -\frac{2}{T} AB \int e^{j(x-m)\omega_0 t}\, dt = \begin{cases} 0 & r \neq m \\ -2AB & r = m \end{cases}$$

$n = r$

$$\int_T e^{jn\omega_0 t}\, e^{-jn\omega_0 t}\, dt = \begin{cases} 0 & r \neq m \\ T & r = m \end{cases}$$



Si $r = m$; $n = B$

$$d(X_1, X_2) = \sqrt{A^2 + B^2 - 2AB}$$

Si $r \neq m$ $n \neq m$

$$d(X_1, X_2) = \sqrt{A^2 + B^2}$$

$$\theta_{rm} = \cos^{-1}\left(\frac{\langle e^{jn\omega_0 t}, e^{jn\omega_0 t} \rangle}{\| e^{jn\omega_0 t} \| \, \| e^{jn\omega_0} \|} \right)$$