Tut 03 - Lindani Khuzwayo

(7.) a) $\int p(\sigma)\,d\sigma = \frac{1}{\bar{\sigma}} e^{\frac{-\sigma}{\bar{\sigma}}} d\sigma$

Let mean $\bar{\sigma} = 1.0$

$\therefore \int e^{-\sigma} d\sigma = -e^{-\sigma}\Big|_{T=2}^{\infty}$

$= -e^{-\infty} + e^{-2}$

$= e^{-2}$ ⟶

(b)

$\int 4\sigma e^{-2\sigma} d\sigma$, let $u = -2\sigma$

$du = -2\,d\sigma$

$\therefore \frac{du}{d\sigma} = 2$

$= -2\int u \cdot e^{u} \frac{du}{-2} = \int u \cdot e^{u} du$ $\boxed{\int z\,dv = zv - \int v\,dz}$

let $z = e^{u}$ $dv = u\,du$

$z' = e^{u}$ $v = \frac{u^2}{2}$

$= e^{u}\frac{u^2}{2} - \int \frac{u^2}{2} du$

$= \frac{e^{u}u^2}{2} - \frac{1}{2}\int u^2 du$

$= \left[\frac{e^{u}u^2}{2} - \frac{u^3}{6}\right]_{T=2}^{\infty}$

$= \frac{e^{-2\sigma}(-2\sigma)^2}{2} - \frac{(-2\sigma)^3}{6}$

$= \left[2e^{-2\sigma}\sigma^2 + \frac{4}{3}\sigma^3\right]_{T}^{\infty}$ ⇒ ~~~~.

(10) $N = (\theta_3 / \Omega) \times PRF$

$\Omega \rightarrow$ rad/sec

given $\rightarrow$ 12.5 rev per minutes

$\Omega = \left(\frac{12.5}{60} \times 2\pi \right)$ rad/s

$\theta_3 = 1.4°$

~~PRF =~~ $\frac{R_{ua}}{1} = \frac{c}{2PRF}$

$2PRF \times R_{ua} = c$

$PRF = \frac{c}{2R_{ua}} = \frac{299792458}{2 \times (60 \times 1.15078)}$

$\therefore N = \left[\frac{1.4}{\left(\frac{12.5}{60} \times 2\pi\right)} \right] \times \frac{299792458}{2 \times (60 \times 1.15078)} =$ _____.

(11)

$\Delta\theta = \frac{C}{2LF} = \frac{\lambda}{2L} = \frac{299792458}{2 \times (47 \times 38) \times \left(\frac{299792458}{2 \times (60 \times 1.15078)} \right)}$

$L = 47 \times 38$

$\Delta\theta =$ _____

Chapter 18 :

17. $R_{ua} = C \cdot \frac{PRI}{2} = \frac{C}{2 \times PRF}$

$= \frac{299792458}{2 \times (1/5 \times 10^3)}$

$\leq 29,98 km \rightarrow$

$R = \frac{C \times \Delta T}{2}$

$\therefore \Delta T = \frac{2R}{C} = \frac{2 \times (80,467)}{299792458} = 5,4 \times 10^{-3} s \rightarrow$

$\therefore N = PRF \times \Delta T = 5,4 \times 10^{-3} \times (5 \times 10^3)$

$= 27 \rightarrow$.

$R_{app} = R_{true} + R_{ay}$

$= 29 km + 86 m$

$= 238 Km \rightarrow$