Дано:

GPS L1 C/A

$f_{if} = 8{,}54$ МГц

$F_d = 99{,}375$ МГц

$q = 27 + 18 = 45$ дБГц

$T = 1$ мс

$f_d = 100 \cdot 18 = 1800$ Гц

$f_{d,rep} = f_d$

$\tau = \tau_{rep}$

Построить на ш-ии I, Q вид множества кор. сумм

Решение:

$A_{IQ} = A_{IQ}(\delta\tau, \delta\omega, q_{c/n_0})$

$A_{IQ}(\delta\tau_k, \delta\omega_k) = \frac{A_k L}{2} \left| \rho(\delta\tau_k) \operatorname{sinc}\left(\frac{\delta\omega_k T}{2}\right) \right|$

$L = F_d \cdot T = 99375$

$f_{d,rep} = f_d \Rightarrow \delta\omega_k = 0$

$\operatorname{sinc}(x) = \begin{cases} \frac{\sin(\pi x)}{\pi x}, & x \neq 0 \\ 1, & x = 0 \end{cases}$

$\Rightarrow \operatorname{sinc}\left(\frac{\delta\omega_k T}{2}\right) = \operatorname{sinc}(0) = 1$

$\tau = \tau_{rep} \Rightarrow \delta\tau_k = 0$

У системы GPS L1 C/A:

$P(\delta\tau_k = 0) = 1$. В итоге

$$A_{IQ} = \frac{A_k L}{2} = \sigma_{IQ}\sqrt{2 q_{c/no} T}$$

Пусть $\sigma_n = 10$

$$q_{c/no} = \frac{A_k^2}{4 T_d \sigma_n^2} \Rightarrow A_k = 2\sigma_n \sqrt{q_{c/no} T_d}, \quad T_d \geq \frac{1}{F_d}$$

$$q_{c/no} = 10^{\frac{q_{c/no,dB}}{10}} = 10^{\frac{45}{10}} = 3{,}1623 \cdot 10^4$$

$$A_k = 2 \cdot 10 \sqrt{3{,}1623 \cdot 10^4 \cdot \frac{1}{99{,}375 \cdot 10^6}} =$$

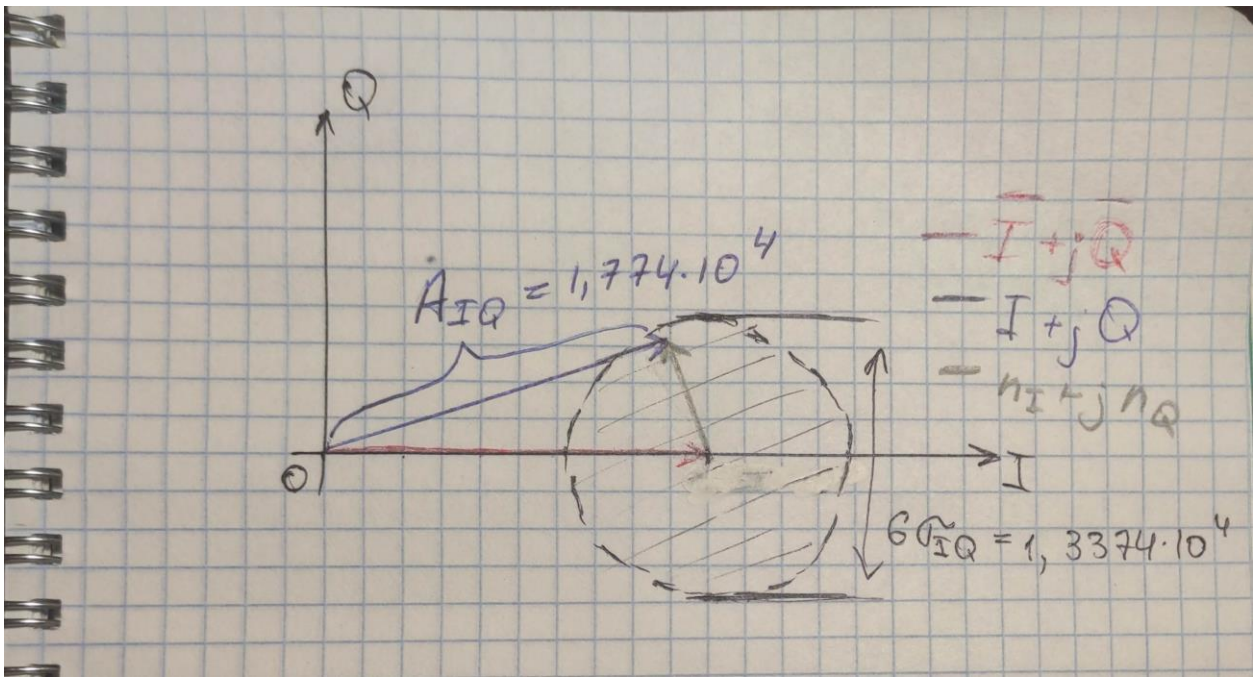
$$= 0{,}357$$

$$A_{IQ} = \frac{0{,}357 \cdot 99375}{2} = 1{,}774 \cdot 10^4$$

$$\sigma_{IQ} = \sigma_n \sqrt{\frac{L}{2}} = 10\sqrt{\frac{99375}{2}} =$$

$= 2{,}229 \cdot 10^3$, тогда $\delta\sigma_{IQ} = 13{,}374 \cdot 10^3$

Угол поворота $\delta\varphi_k = \frac{\delta\omega_k T}{2} + \delta\varphi_k = 0$ (положим $\delta\omega_k = 0$)


Q
$A_{IQ} = 1,774 \cdot 10^4$
$\bar{I} + j\bar{Q}$
$I + jQ$
$n_I + jn_Q$
O
I
$6\sigma_{IQ} = 1,3374 \cdot 10^4$