



Isi Pembahasan Week 10:

Array 2

Contoh Array dengan 6 Elemen Antena

$$AF_N = \frac{1}{6} \frac{\sin\left(\frac{6\psi}{2}\right)}{\sin\left(\frac{\psi}{2}\right)}$$

dengan

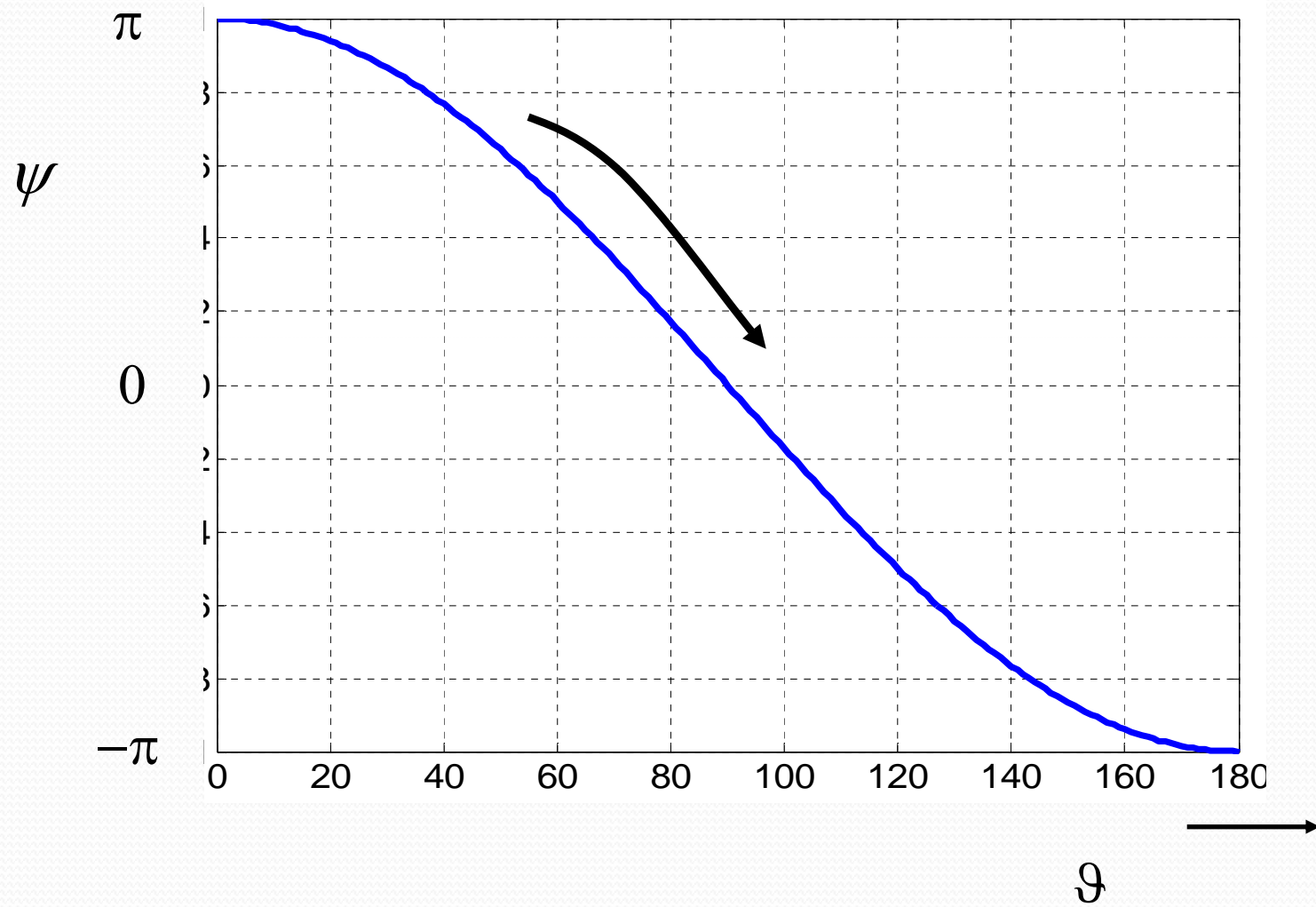
$$\psi = 2\pi \frac{d}{\lambda} \cos \vartheta + \beta$$

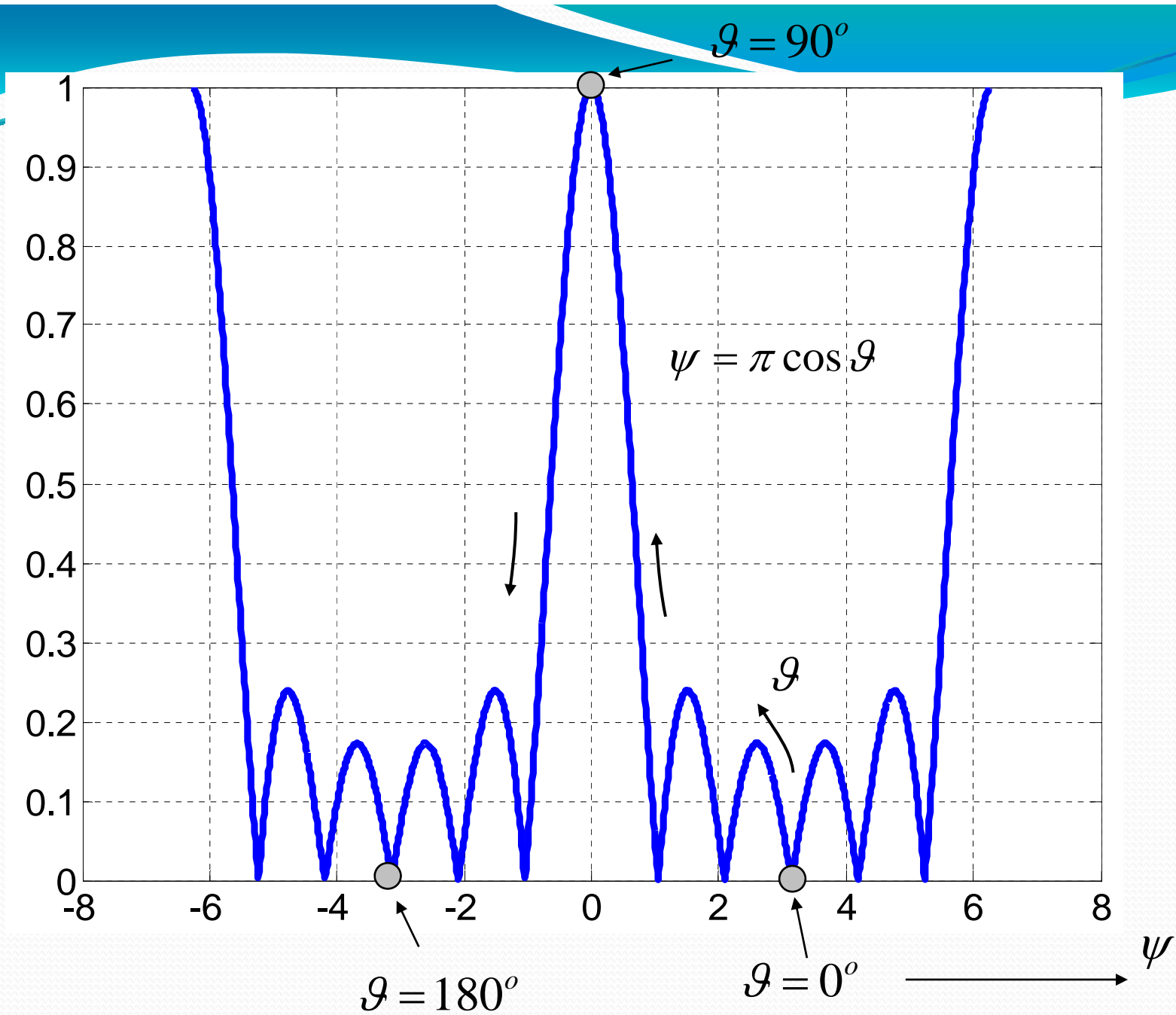
Kasus 1 : Jarak $d = \lambda/2$ dan se-phasas ($\beta = 0$)

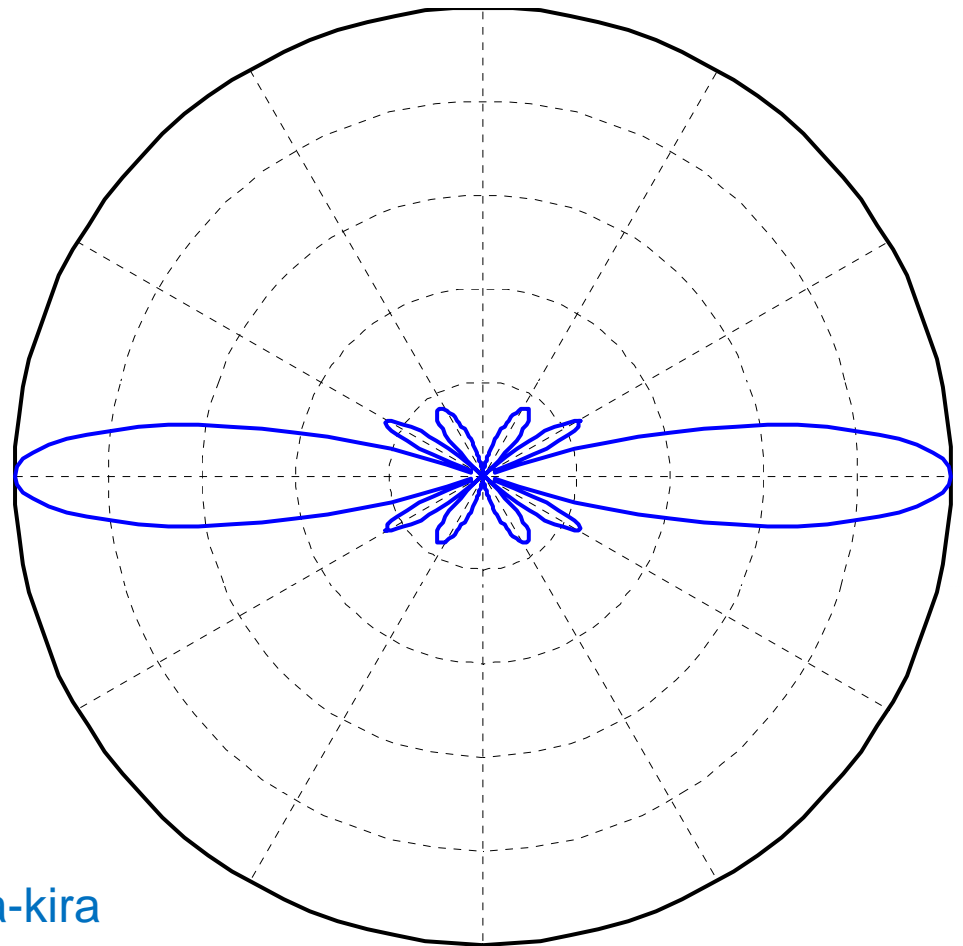
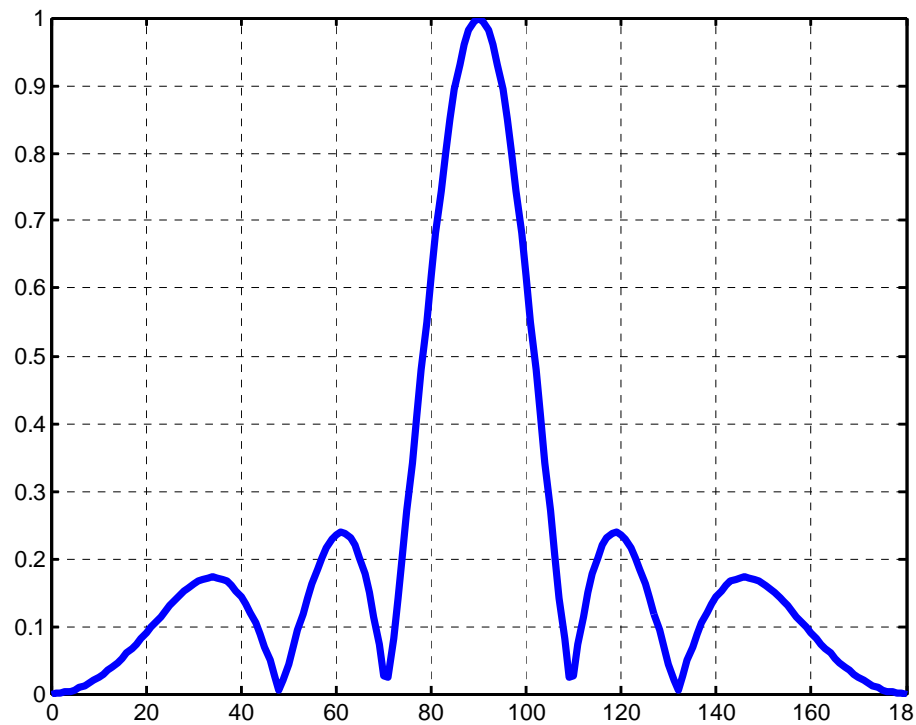
maka $\psi = \pi \cos \vartheta$

parameter ϑ adalah sudut di ruang dengan variasi $0 \leq \vartheta \leq 180^\circ$

maka variasi ψ terhadap ϑ bisa digambarkan dengan





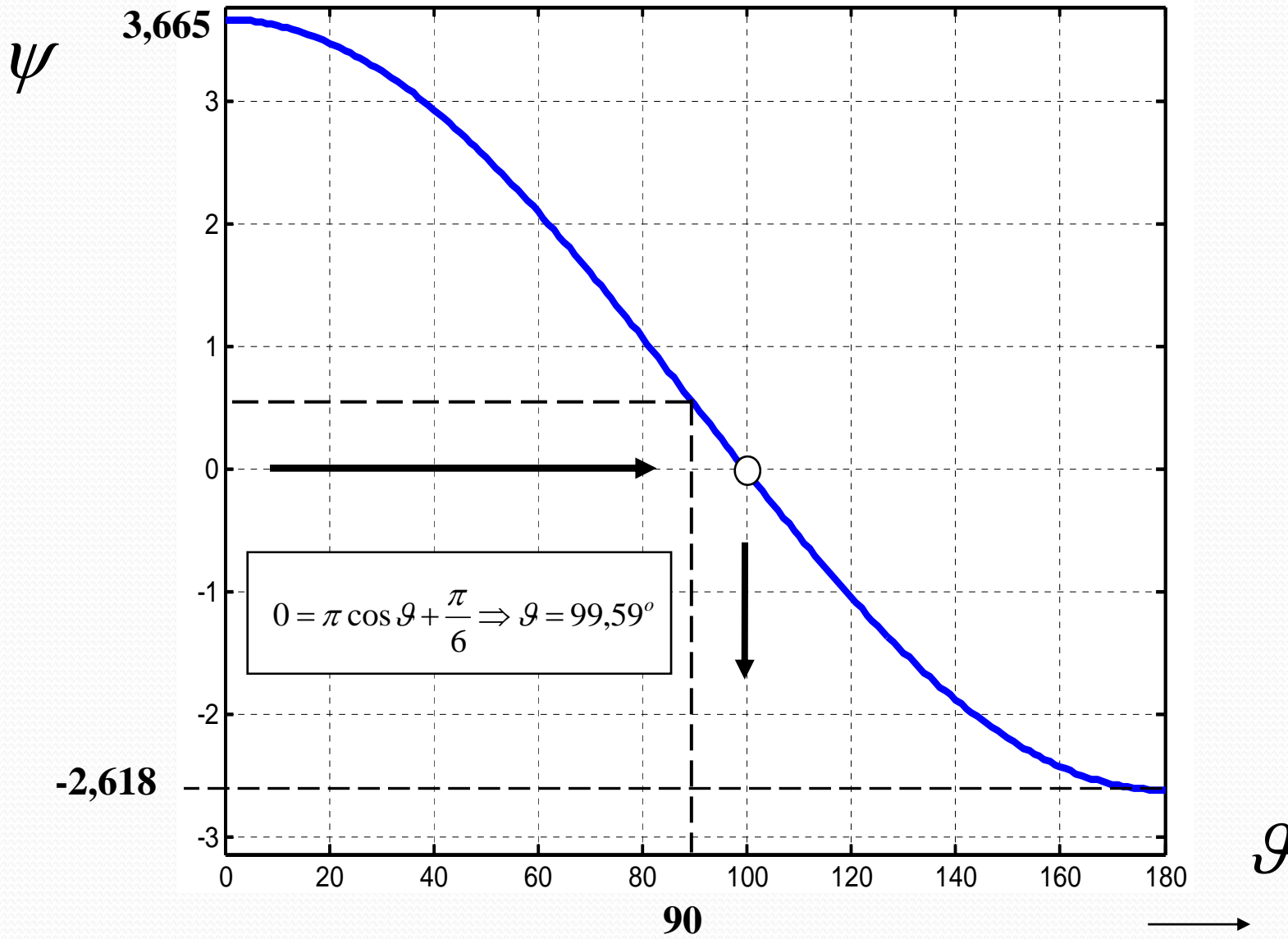


Dari modul 10 : side lobe 1 terletak kira-kira pada $\psi = 1,571$, maka

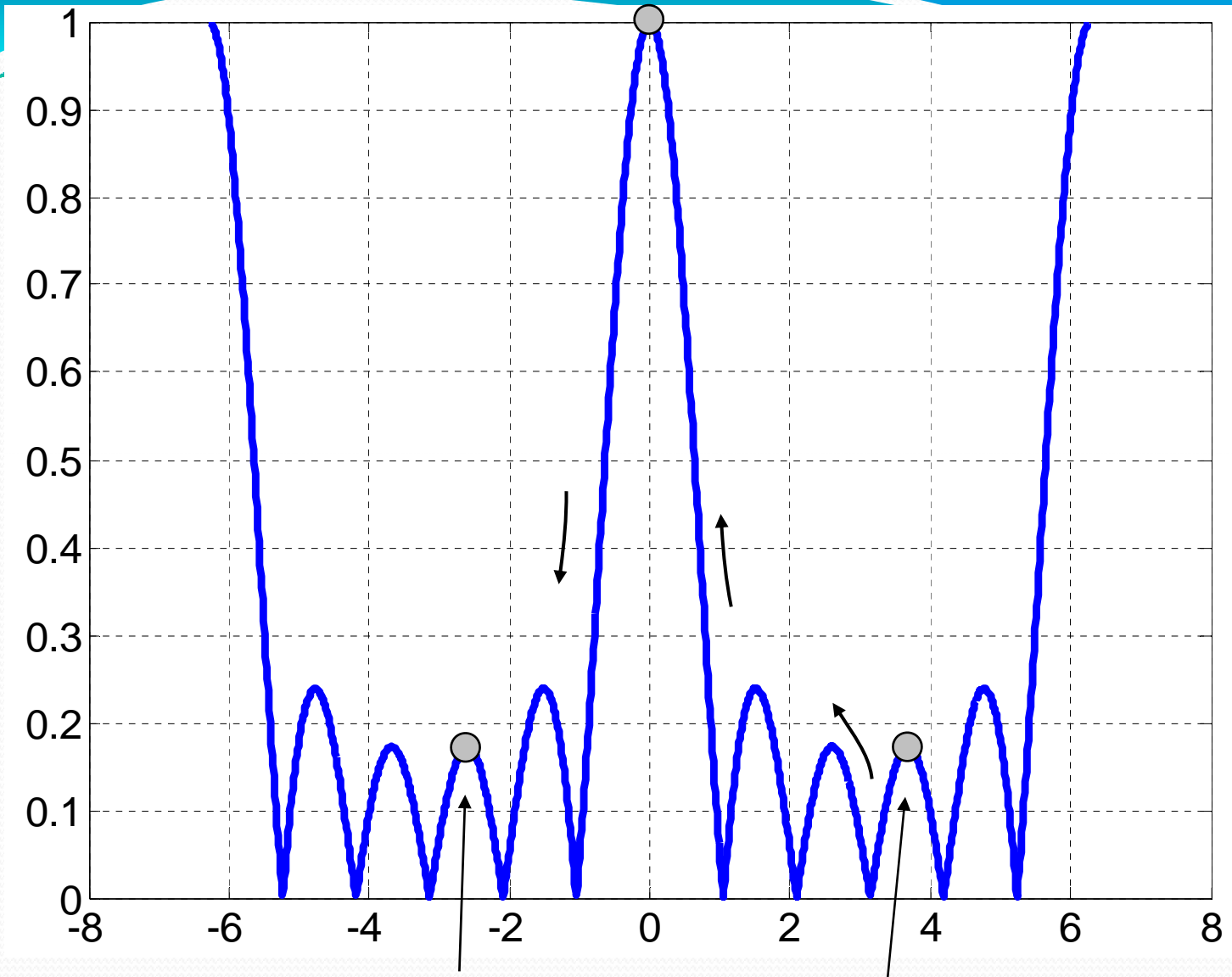
$$\theta_{SL,1} = \arccos\left(\frac{1,571}{\pi}\right) = 60^\circ$$

dengan peredaman sebesar $-12,55$ dB.

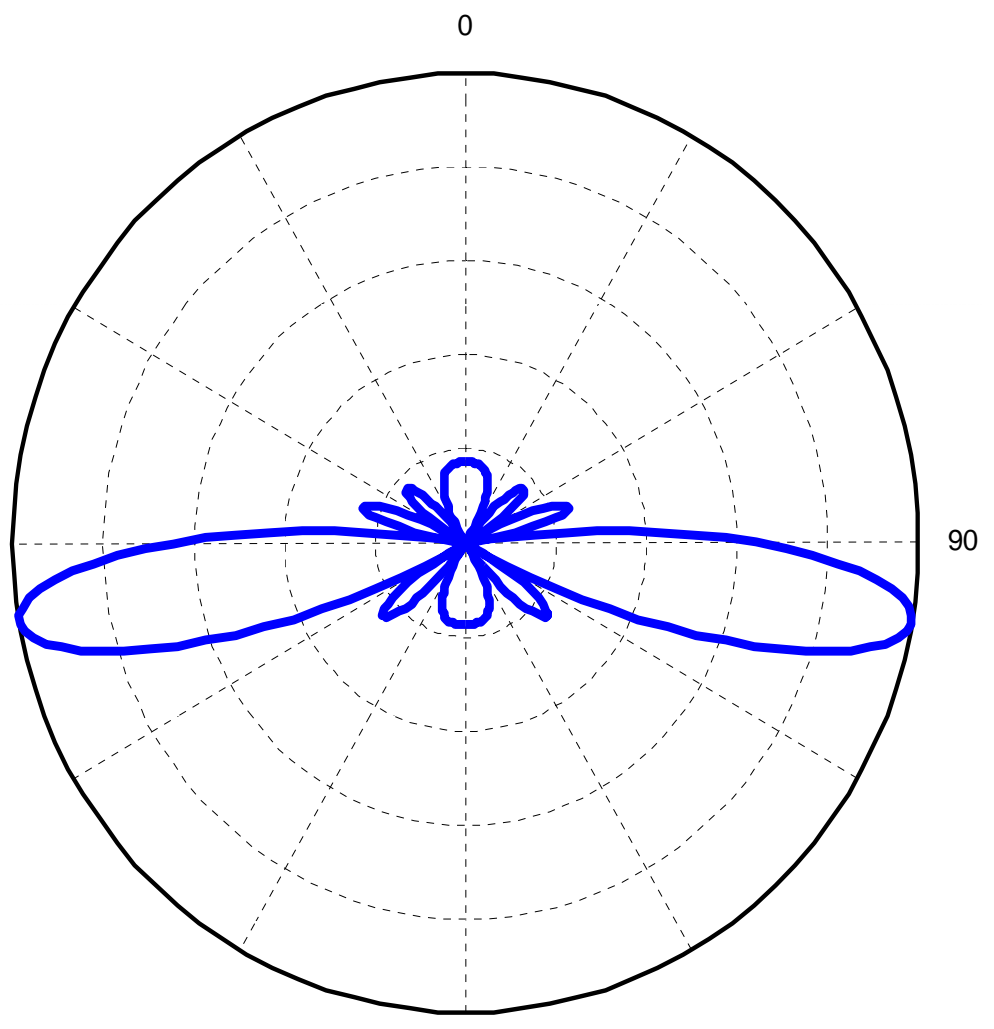
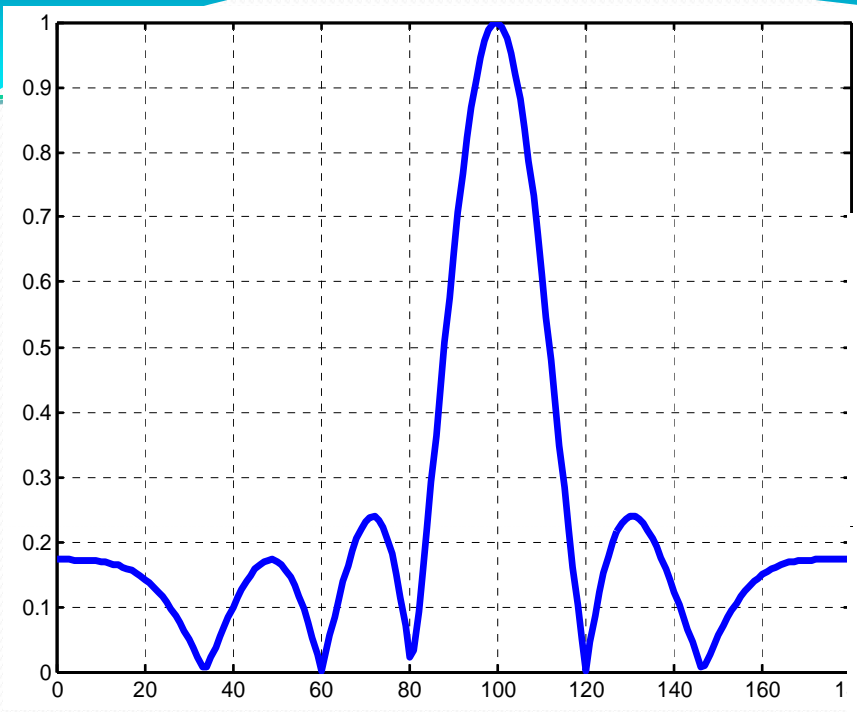
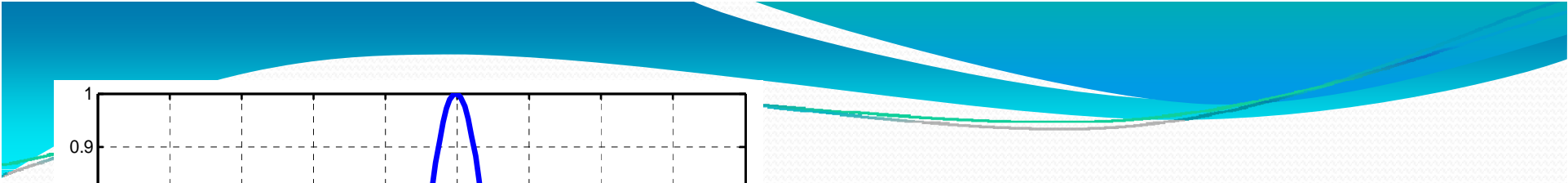
Kasus 2 : Jarak $d = \lambda/2$ dan se-phasas ($\beta = 30^\circ$) maka $\psi = \pi \cos \theta + \frac{\pi}{6}$



$$\vartheta = 99,59^\circ$$



$$\vartheta = 180^\circ (\psi = -2,618) \quad \vartheta = 0^\circ (\psi = 3,665)$$



Contoh perhitungan:

Array dengan 6 buah elemen dengan amplitudo sama, tapi fasa berubah linier dengan $\beta = 30^\circ$.

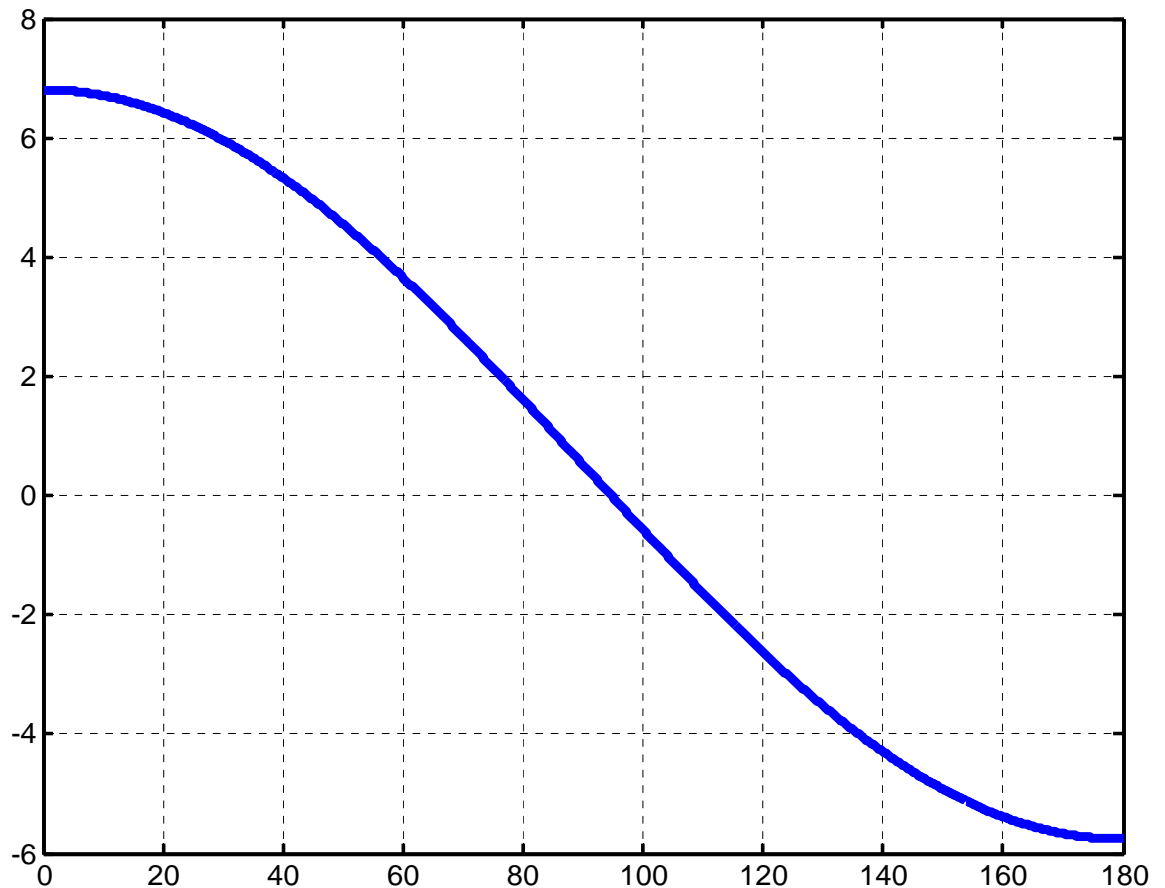
Jarak antar elemen $d = \lambda$.

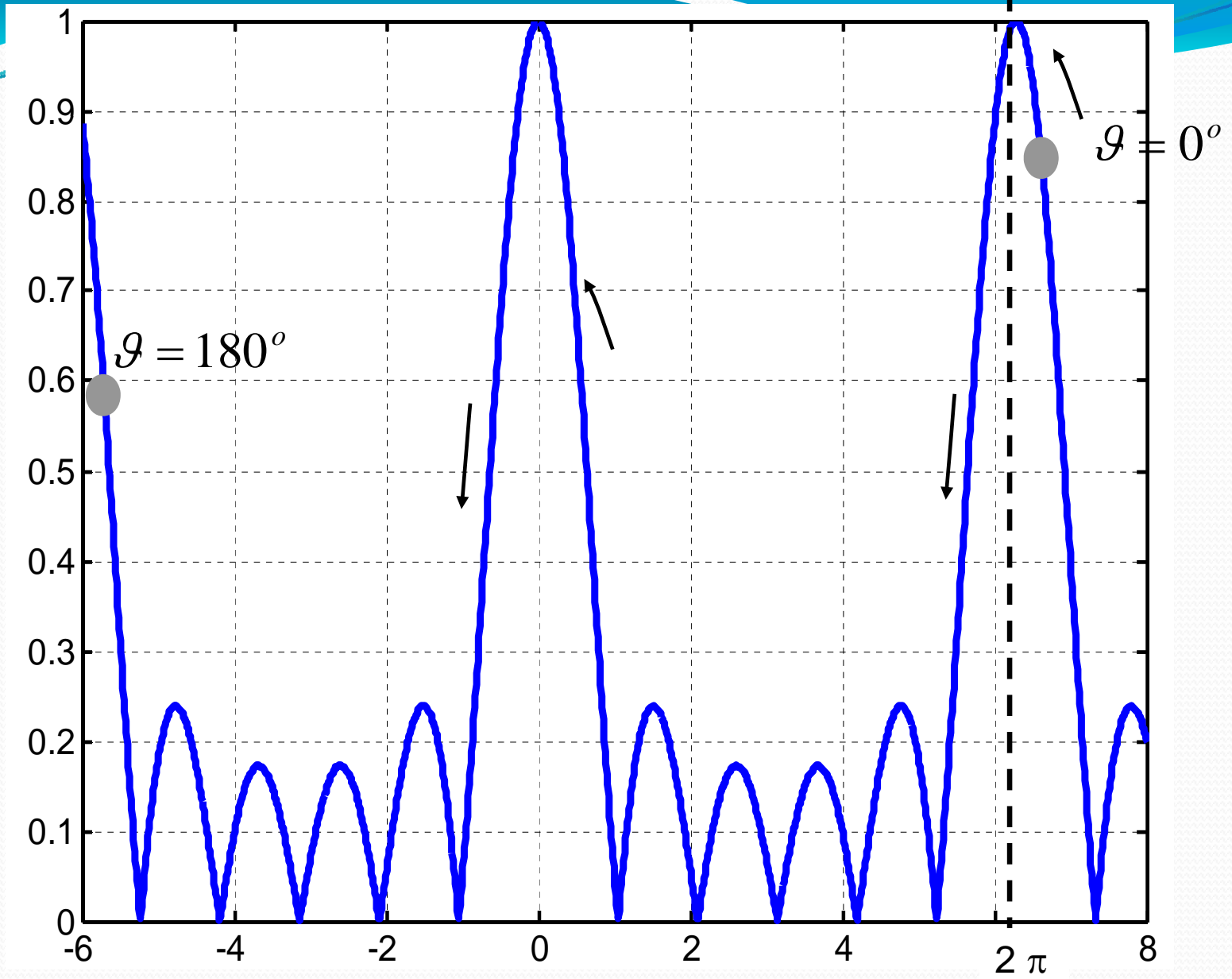
Sketsa diagram radiasi, arah radiasi utama, side lobes dan redamannya !

$$\begin{aligned}\psi &= 2\pi \frac{d}{\lambda} \cos \vartheta + \beta \\ &= 2\pi \cos \vartheta + \frac{\pi}{6}\end{aligned}$$

6,81

-5,76





Maksima terjadi pada $\psi = 2\pi = 2\pi \cos \vartheta + \frac{\pi}{6} \Rightarrow \vartheta = 23,56^\circ$

dan $\psi = 0 = 2\pi \cos \vartheta + \frac{\pi}{6} \Rightarrow \vartheta = 94,78^\circ$

Arah-arrah side lobes, dengan menggunakan data pada modul 10:

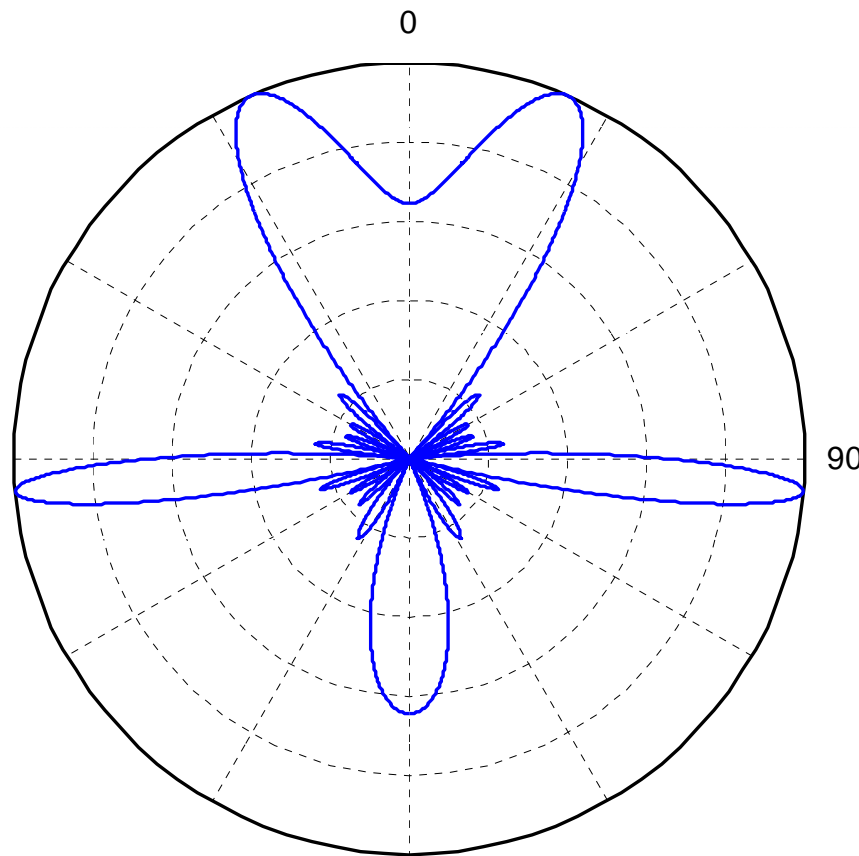
	ψ	$\vartheta = \arccos \left[\left(\psi - \frac{\pi}{6} \right) / 2\pi \right]$	Peredaman (dB)
1	4,712	$\arccos \left[\left(4,712 - \frac{\pi}{6} \right) / 2\pi \right] = 48,2^\circ$	-12.55
2	3,665	60°	-15.26
3	2,618	$70,53^\circ$	-15.26
4	1,571	$80,4^\circ$	-12.55
5	-1,571	$109,47^\circ$	-12.55
6	-2,618	120°	-15.26
7	-3,665	$131,81^\circ$	-15.26
8	-4,712	$146,44^\circ$	-12.55

Dan tambahan side lobe pada $\theta = 180^\circ$ atau pada $\psi = -5,76$

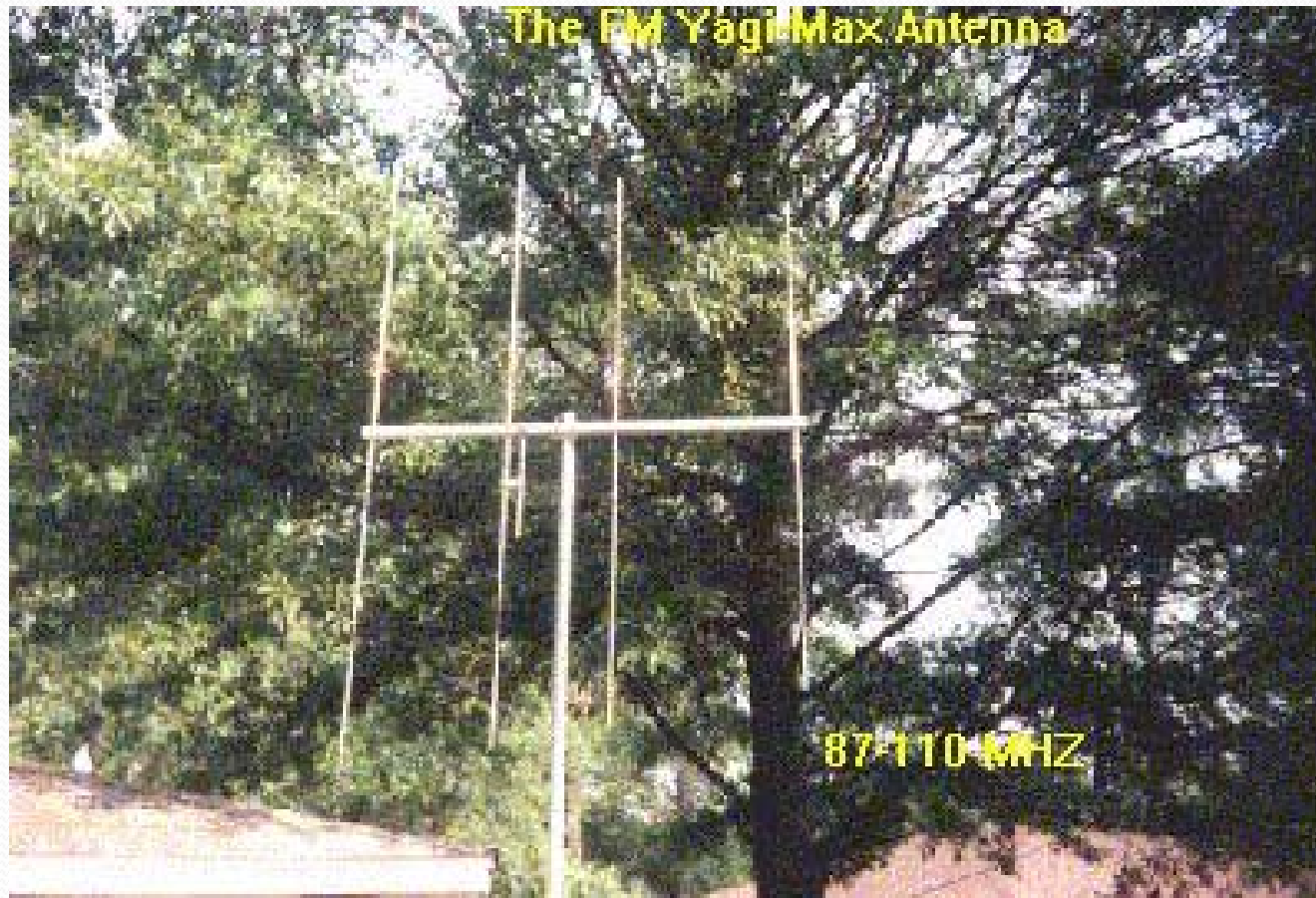
dengan peredaman :

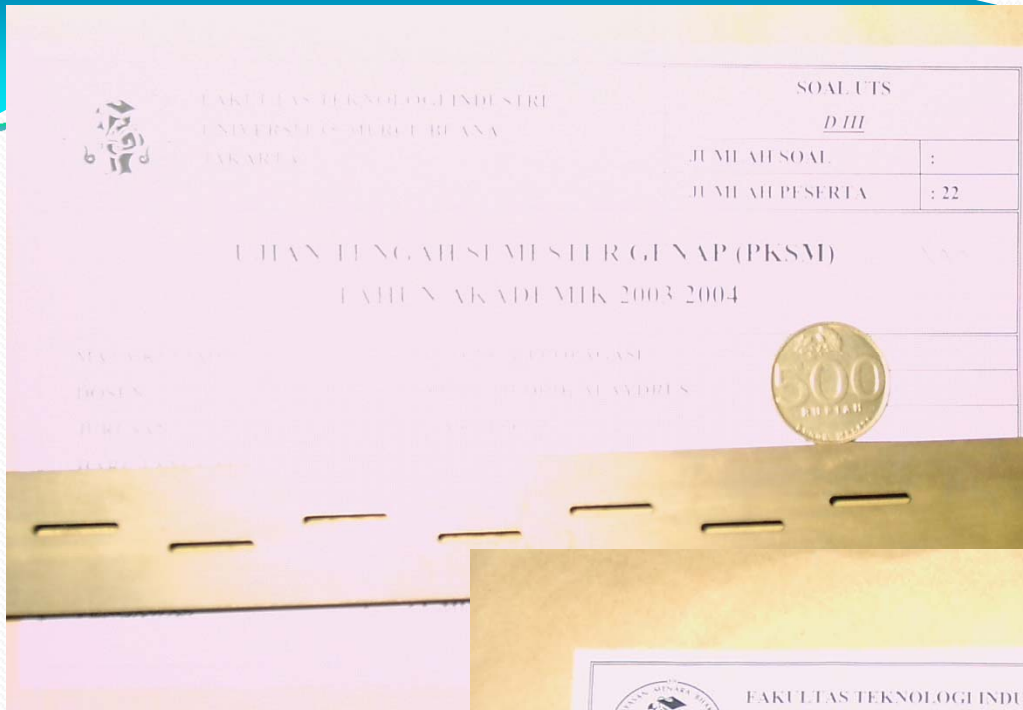
$$AF_N = \frac{1}{6} \frac{\sin\left(\frac{6\psi}{2}\right)}{\sin\left(\frac{\psi}{2}\right)} = 0,644$$

atau $-3,82$ dB.



Array Berbagai macam Antena





Observasi astronomi

