6.6.1 $N = 10$, $d = \lambda/2$ $S_n = \sigma_w^2 \underline{I}$ $\underline{v}_m = \underline{1}$

$$\underline{S}_x = \sigma_s^2 \underline{v}_a \underline{v}_a^{\#} + \sigma_w^2 \underline{I}$$

$$\underline{w}_{MPDR} = \frac{\underline{S}_x^{-1} \underline{1}}{\underline{1}^{\#} \underline{S}_x^{-1} \underline{1}}$$

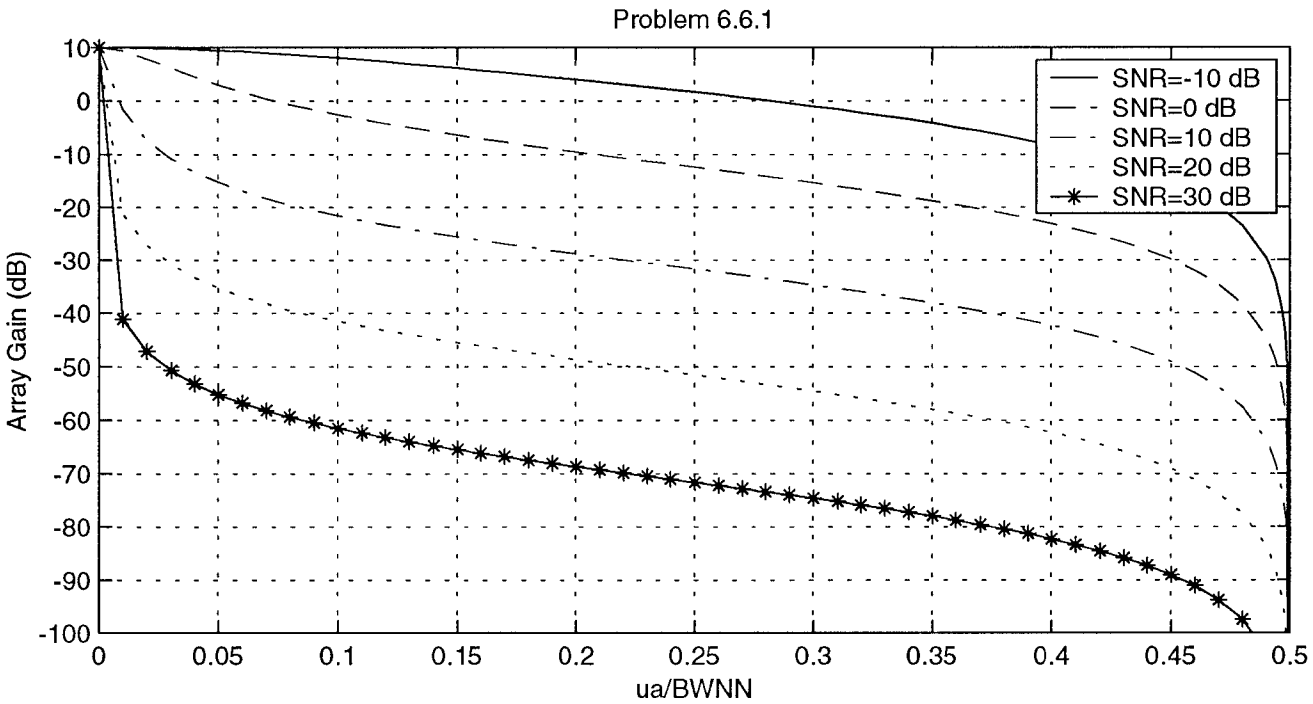
$$A_{MPDR} = \frac{\sigma_s^2 |\underline{w}^{\#} \underline{v}_a|^2}{\underline{w}^{\#} \sigma_w^2 \underline{I} \underline{w}} \Big/ \frac{\sigma_s^2}{\sigma_w^2} = \frac{|w^{\#} v_a|^2}{w^{\#} w}$$

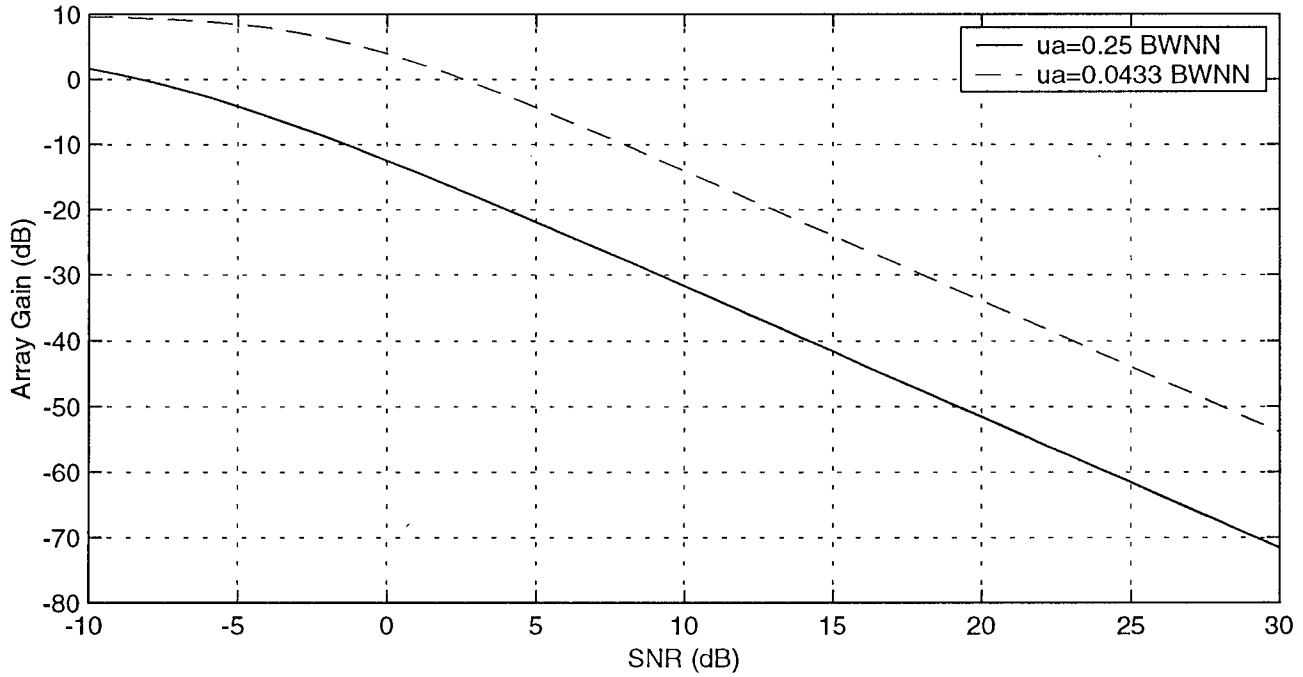
(a,b) plots next page - Array gain decreases with more mismatch, more severe for high SNR

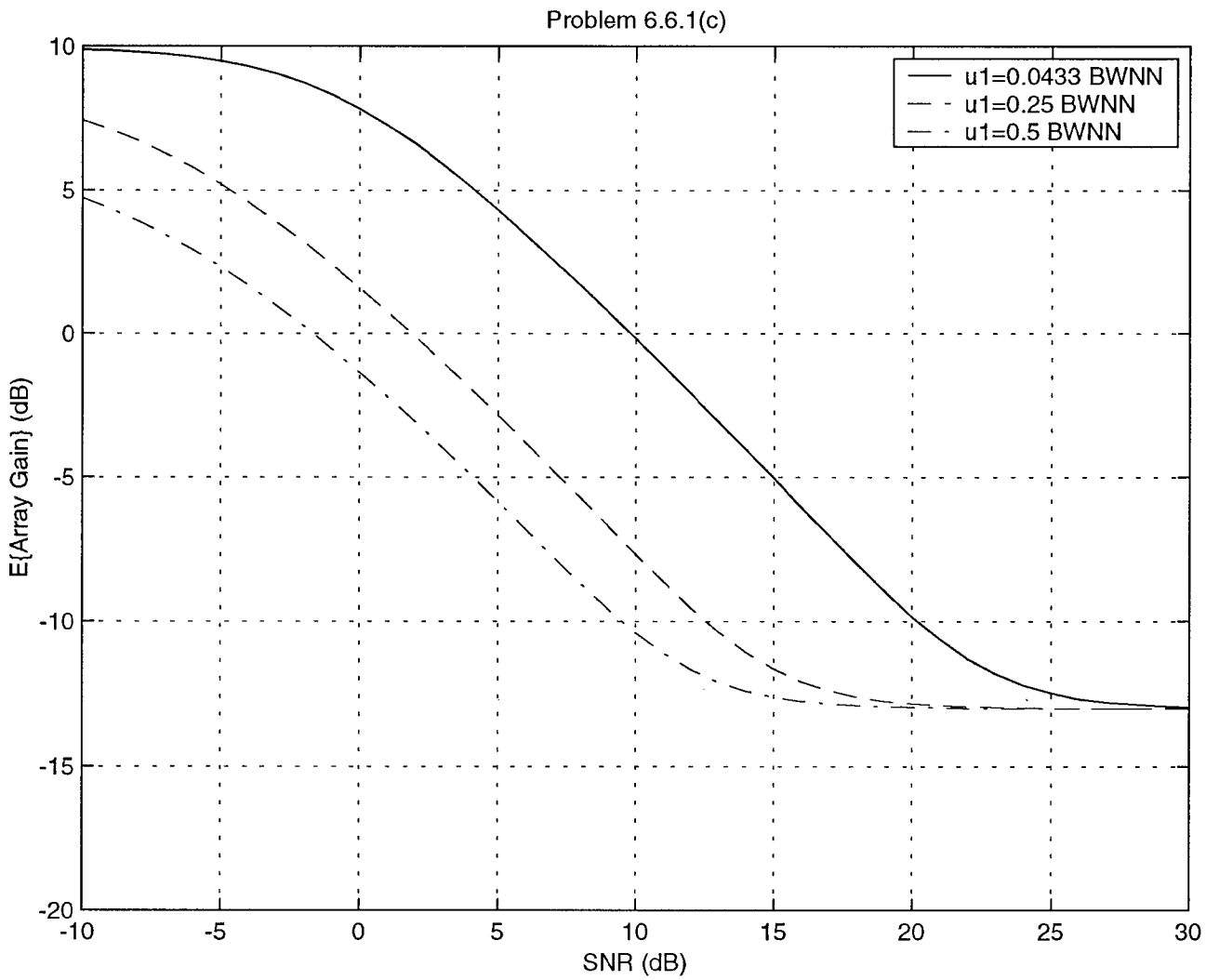
(c) $u_a \sim U[-u_1, u_1]$

$$E[A_{MPDR}] = \int_{-u_1}^{u_1} A_{MPDR}(u_a) \frac{1}{2u_1} du_a$$

$u_1 = 0.0433\,BWNN,\ 0.25\,BWNN,\ 0.50\,BWNN$


Problem 6.6.1
SNR=-10 dB
SNR=0 dB
SNR=10 dB
SNR=20 dB
SNR=30 dB
Array Gain (dB)
ua/BWNN
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0.4
0.45
0.5


ua=0.25 BWNN
ua=0.0433 BWNN
Array Gain (dB)
SNR (dB)
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-10
-5
0
5
10
15
20
25
30


Problem 6.6.1(c)
u1=0.0433 BWNN
u1=0.25 BWNN
u1=0.5 BWNN
E{Array Gain} (dB)
SNR (dB)
10
5
0
-5
-10
-15
-20
-10
-5
0
5
10
15
20
25
30