3.5.5 (a), (c), (e)

N=11

beta =

3.6545

w = (a)	(c)	(e)
-0.0633	-0.0062	-0.0075
0.0408	0.0098	0.0127
0.0395	0.0187	0.0215
-0.1534	-0.1122	-0.1187
0.2533	0.2348	0.2379
0.7071	0.7071	0.7071
0.2533	0.2348	0.2379
-0.1534	-0.1122	-0.1187
0.0395	0.0187	0.0215
0.0408	0.0098	0.0127
-0.0633	-0.0062	-0.0075

del =

0.1166	0.0078	0.0087

del_psi =

0.1428	0.5751	0.4748

N=21

beta =

4.6061

w = (a)	(c)	(e)
-0.0070	-0.0006	-0.0004
0.0322	0.0040	0.0038
-0.0351	-0.0071	-0.0074
0.0071	0.0022	0.0023
0.0366	0.0160	0.0165
-0.0633	-0.0363	-0.0369
0.0408	0.0289	0.0291
0.0395	0.0326	0.0327
-0.1534	-0.1411	-0.1413
0.2533	0.2481	0.2482
0.7071	0.7071	0.7071
0.2533	0.2481	0.2482
-0.1534	-0.1411	-0.1413
0.0395	0.0326	0.0327
0.0408	0.0289	0.0291
-0.0633	-0.0363	-0.0369
0.0366	0.0160	0.0165
0.0071	0.0022	0.0023
-0.0351	-0.0071	-0.0074
0.0322	0.0040	0.0038
-0.0070	-0.0006	-0.0004

del =

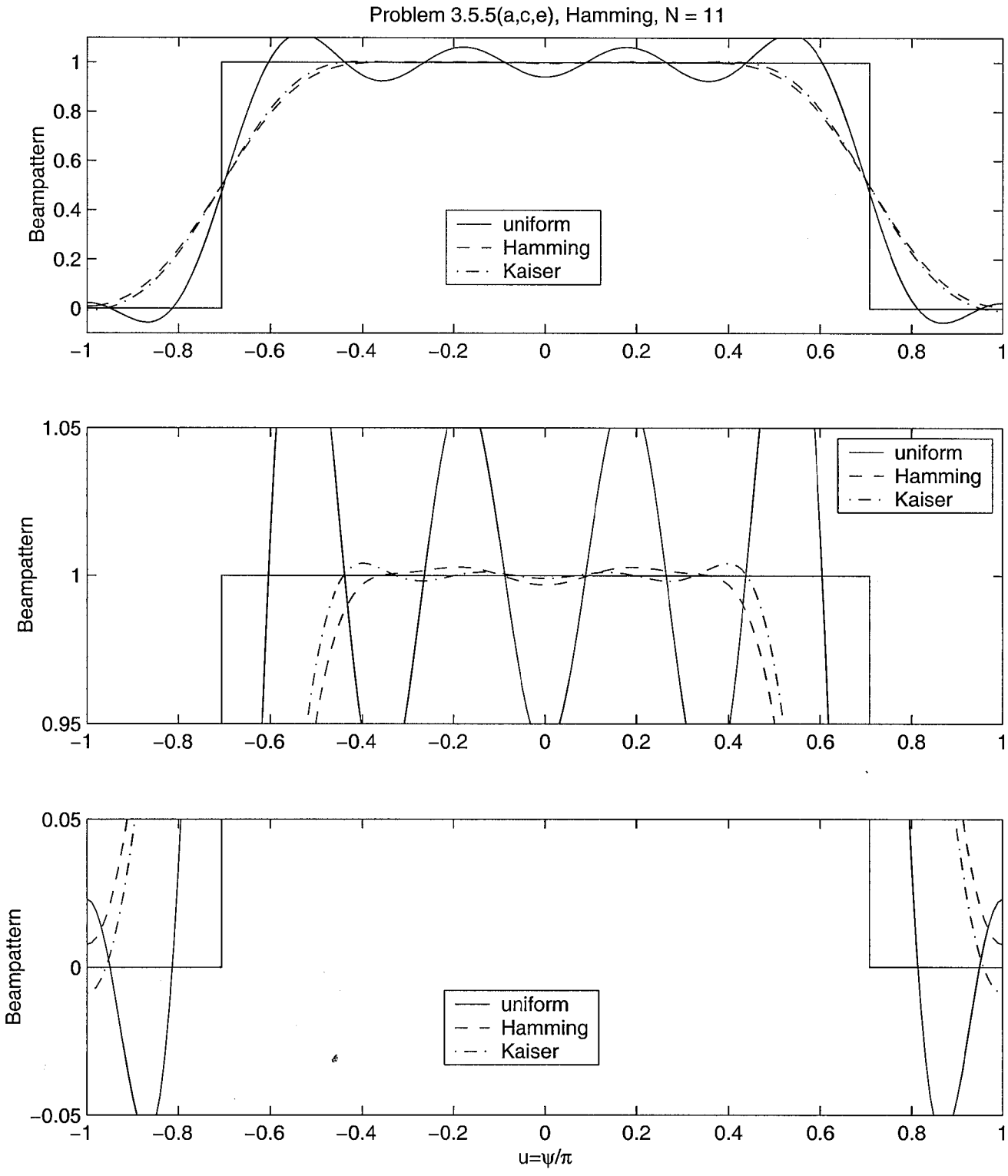
0.1100	0.0030	0.0030

del_psi =

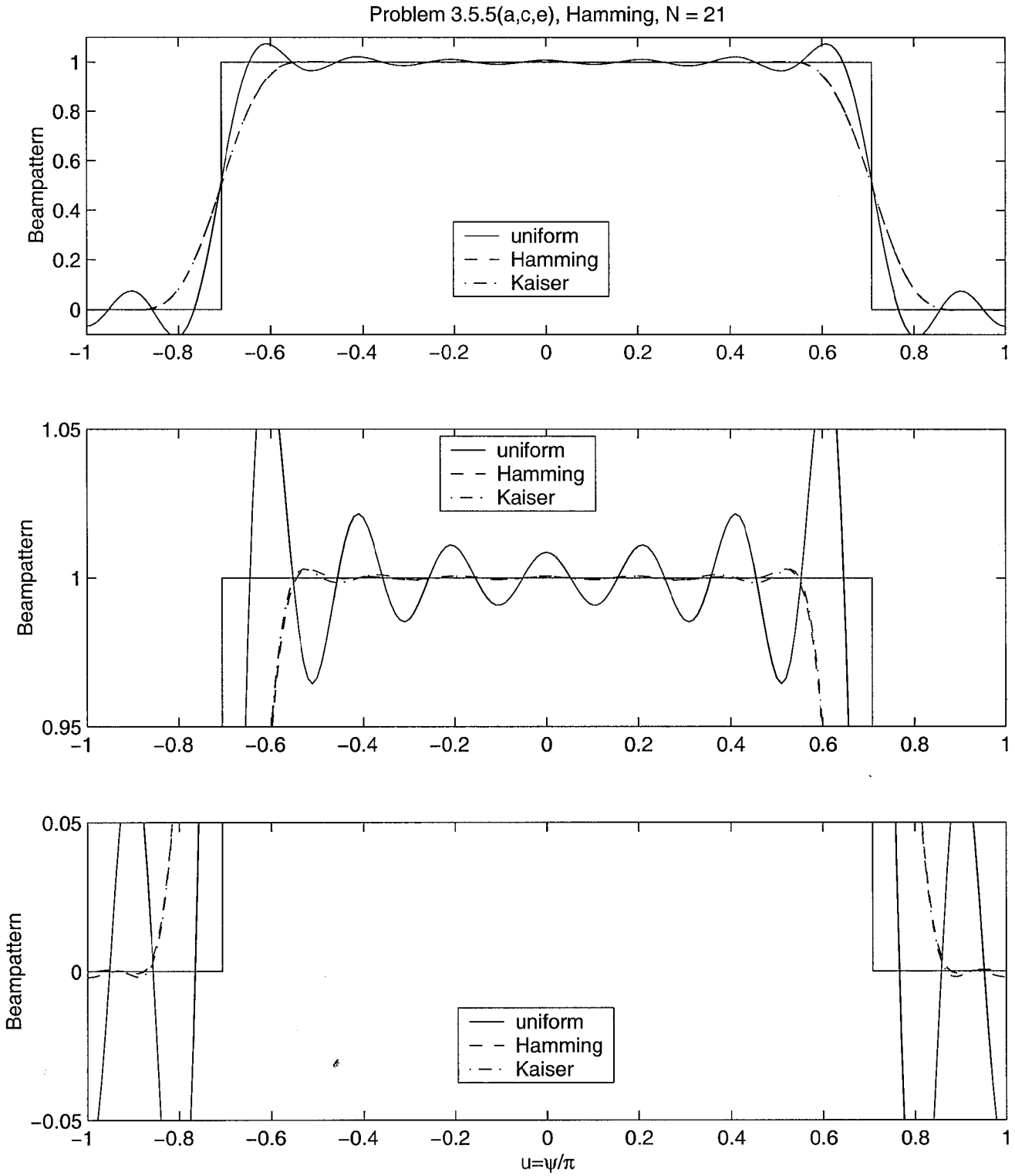
0.0842	0.3086	0.3003

The uniform window has large δ (overshoot/sidelobes) but small $\Delta\phi$ (transition region). The Hamming and Kaiser windows reduce the overshoot/sidelobes at the expense of a wider transition region. The Kaiser window with the appropriate β closely matches the Hamming window.

3.5.5 ace ②


Problem 3.5.5(a,c,e), Hamming, N = 11
Beampattern
uniform
Hamming
Kaiser
1
0.8
0.6
0.4
0.2
0
−1
−0.8
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
0.8
1
1.05
0.95
0.05
−0.05
u=ψ/π

3.5.5 ace (3)


Problem 3.5.5(a,c,e), Hamming, N = 21
Beampattern
uniform
Hamming
Kaiser
1
0.8
0.6
0.4
0.2
0
−1
−0.8
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
0.8
1
1.05
0.95
0.05
−0.05
u=ψ/π