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(54) **SYSTEMS AND METHODS FOR RECEIVING DATA TRANSMITTED USING NON-UNIFORM QAM 256 CONSTELLATIONS**

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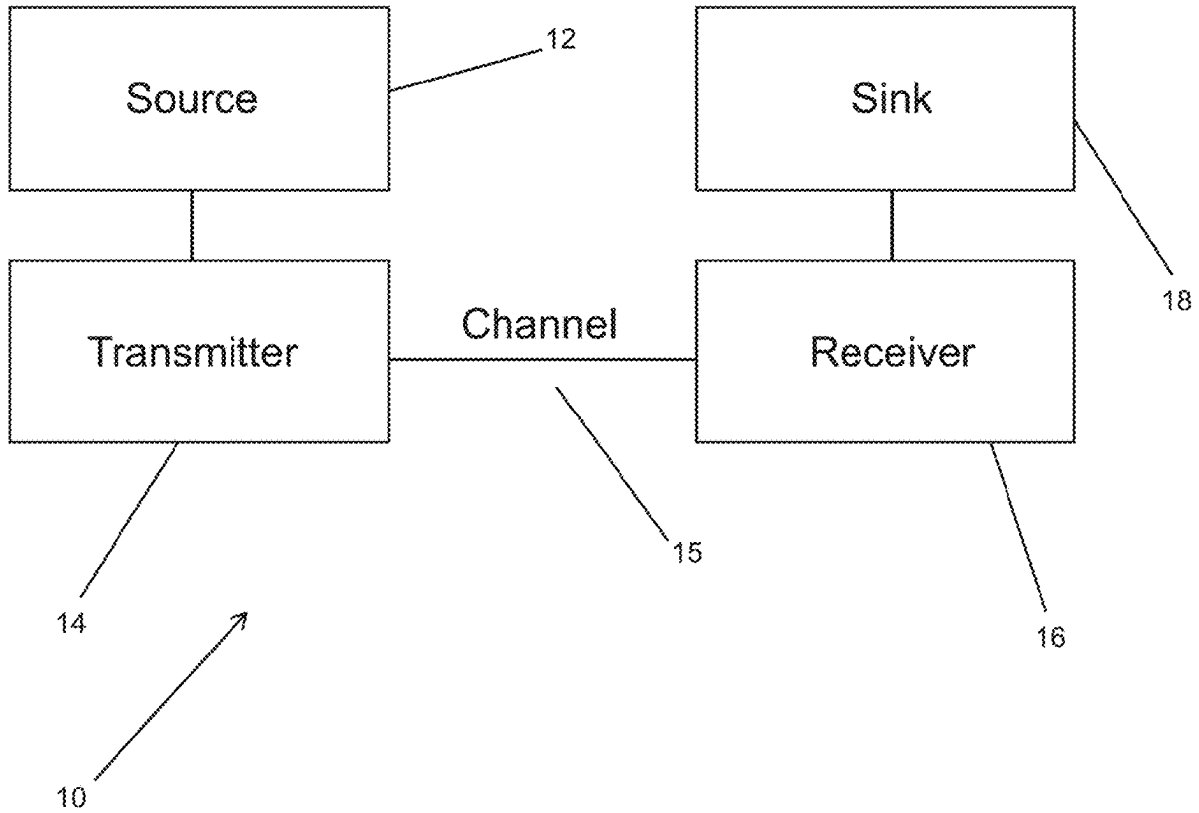
H04L 1/00	(2006.01)

(52) **U.S. Cl.**

CPC ***H04L 27/3405*** (2013.01); ***H04B 14/023*** (2013.01); ***H04L 1/0003*** (2013.01); *H04L 1/0009* (2013.01)

(57) **ABSTRACT**

Communication systems are described that use signal constellations, which have unequally spaced (i.e. 'geometrically' shaped) points. In many embodiments, the communication systems use specific geometric constellations that are capacity optimized at a specific SNR. In addition, ranges within which the constellation points of a capacity optimized constellation can be perturbed and are still likely to achieve a given percentage of the optimal capacity increase compared to a constellation that maximizes d_{min}, are also described. Capacity measures that are used in the selection of the location of constellation points include, but are not limited to, parallel decode (PD) capacity and joint capacity.



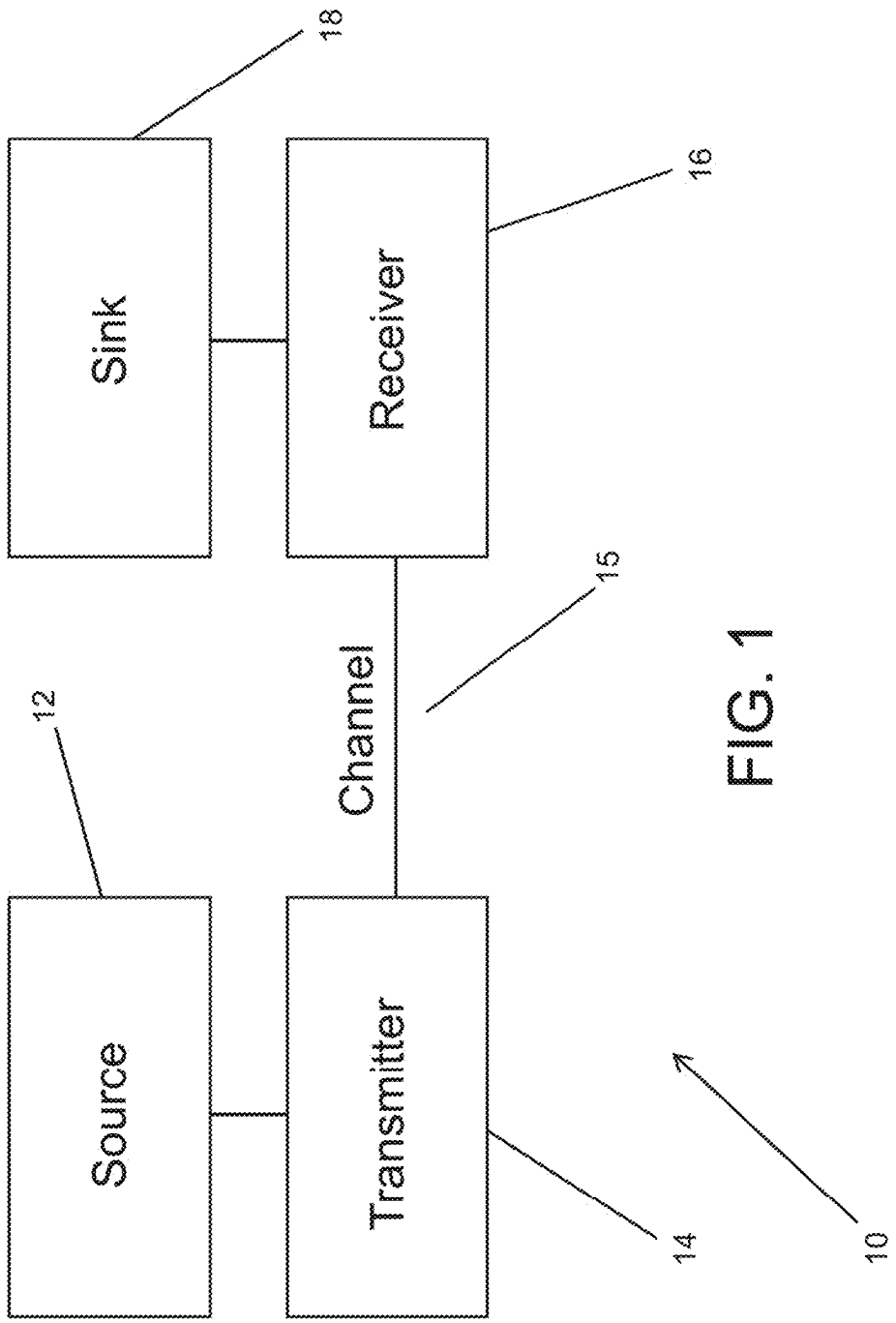


FIG. 1

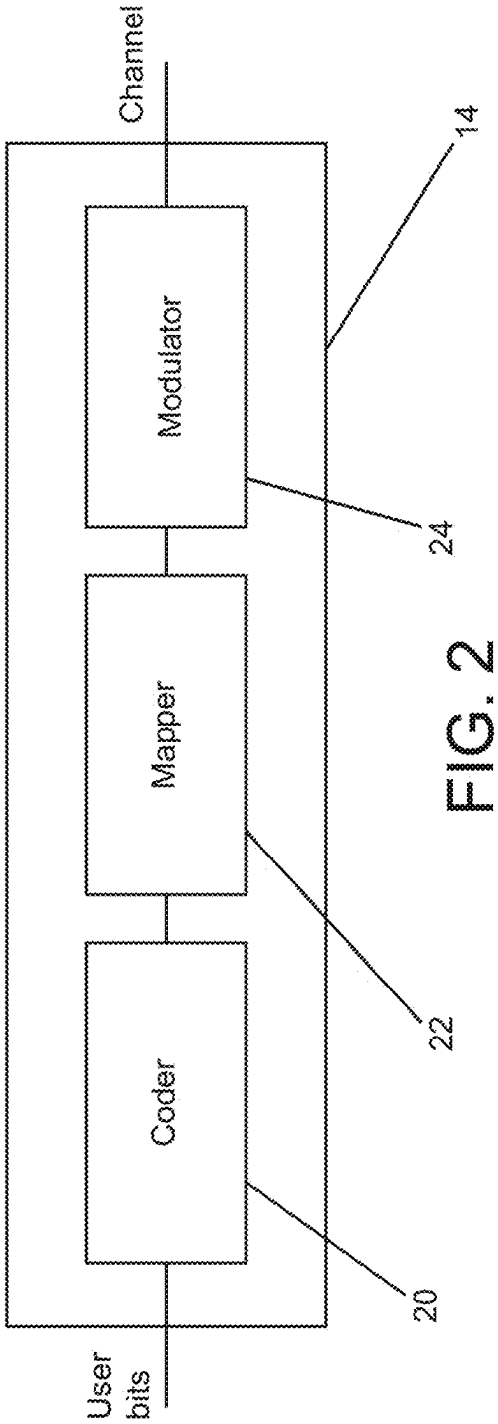

User bits
Channel
Coder
Mapper
Modulator
20
22
24
14

FIG. 2

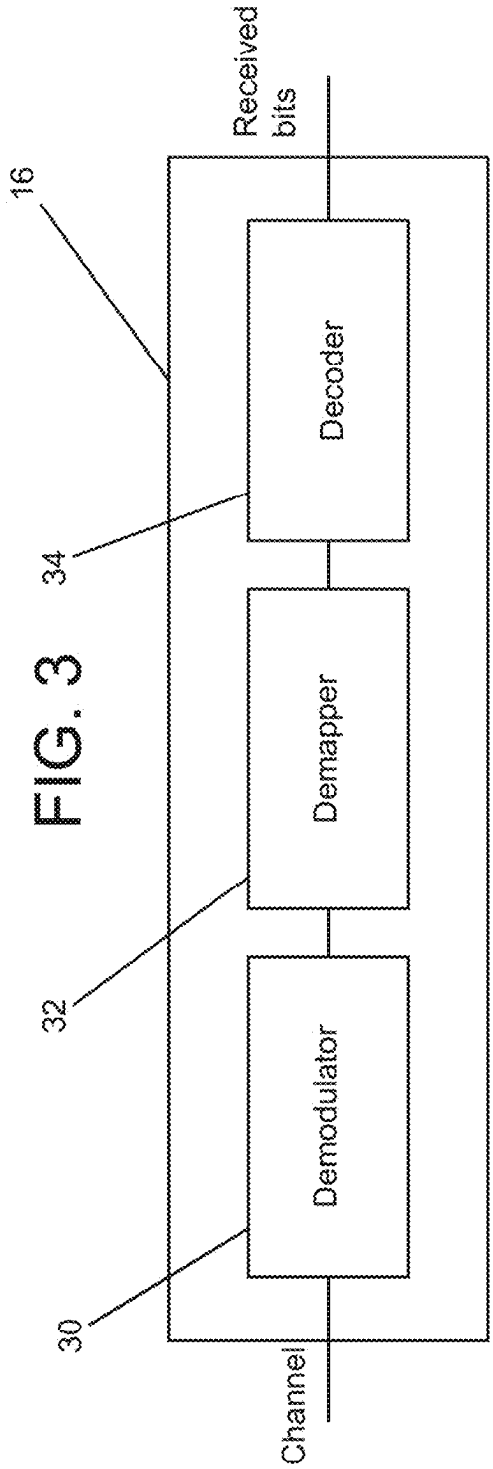

Received bits
Channel
Demodulator
Demapper
Decoder
30
32
34
16

FIG. 3

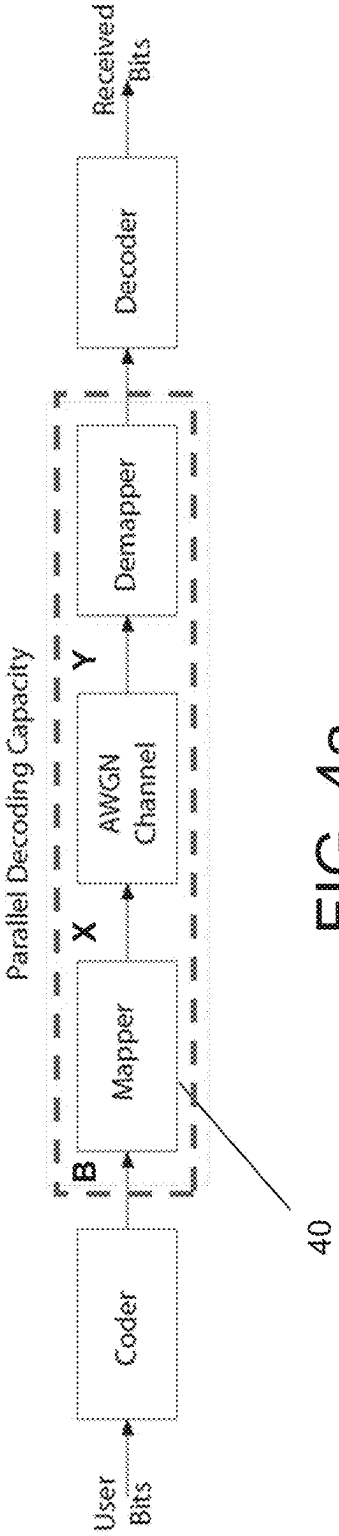

Parallel Decoding Capacity
User Bits
Coder
B
Mapper
X
AWGN Channel
Y
Demapper
Decoder
Received Bits
40

FIG. 4a

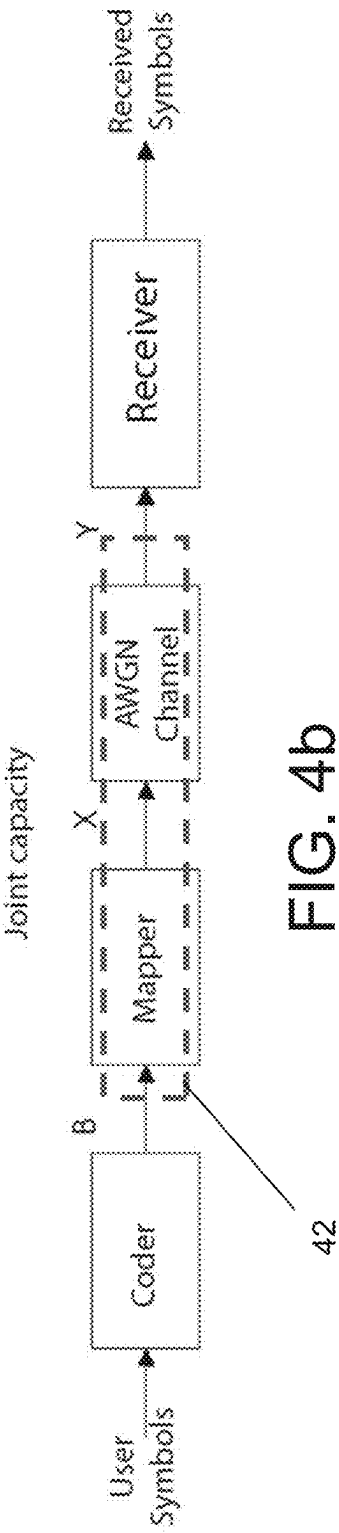

Joint capacity
User Symbols
Coder
B
Mapper
X
AWGN Channel
Y
Receiver
Received Symbols
42

FIG. 4b

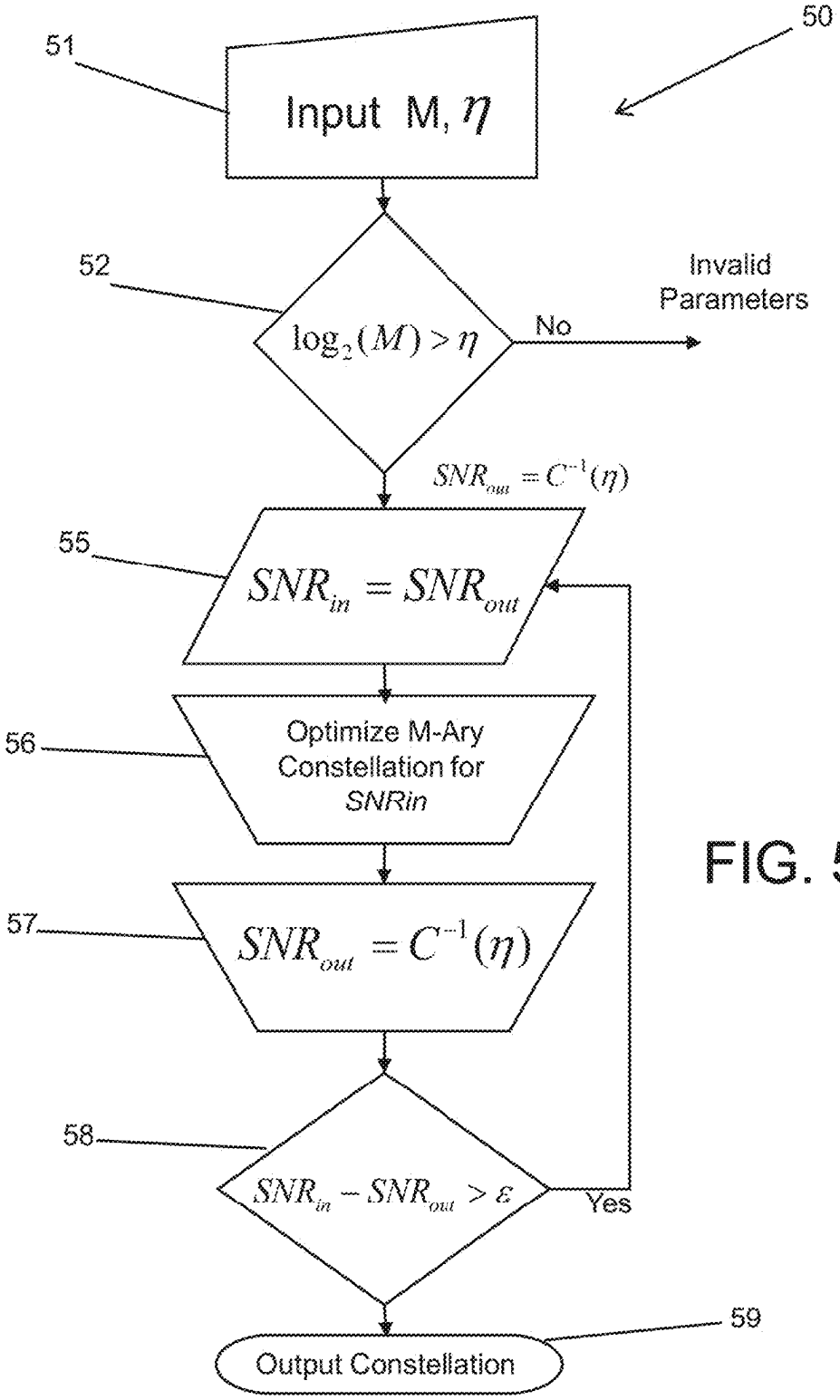

50
51
Input M, η
52
$\log_2(M) > \eta$
No
Invalid Parameters
$SNR_{out} = C^{-1}(\eta)$
55
$SNR_{in} = SNR_{out}$
56
Optimize M-Ary Constellation for SNRin
57
$SNR_{out} = C^{-1}(\eta)$
58
$SNR_{in} - SNR_{out} > \varepsilon$
Yes
59
Output Constellation

FIG. 5

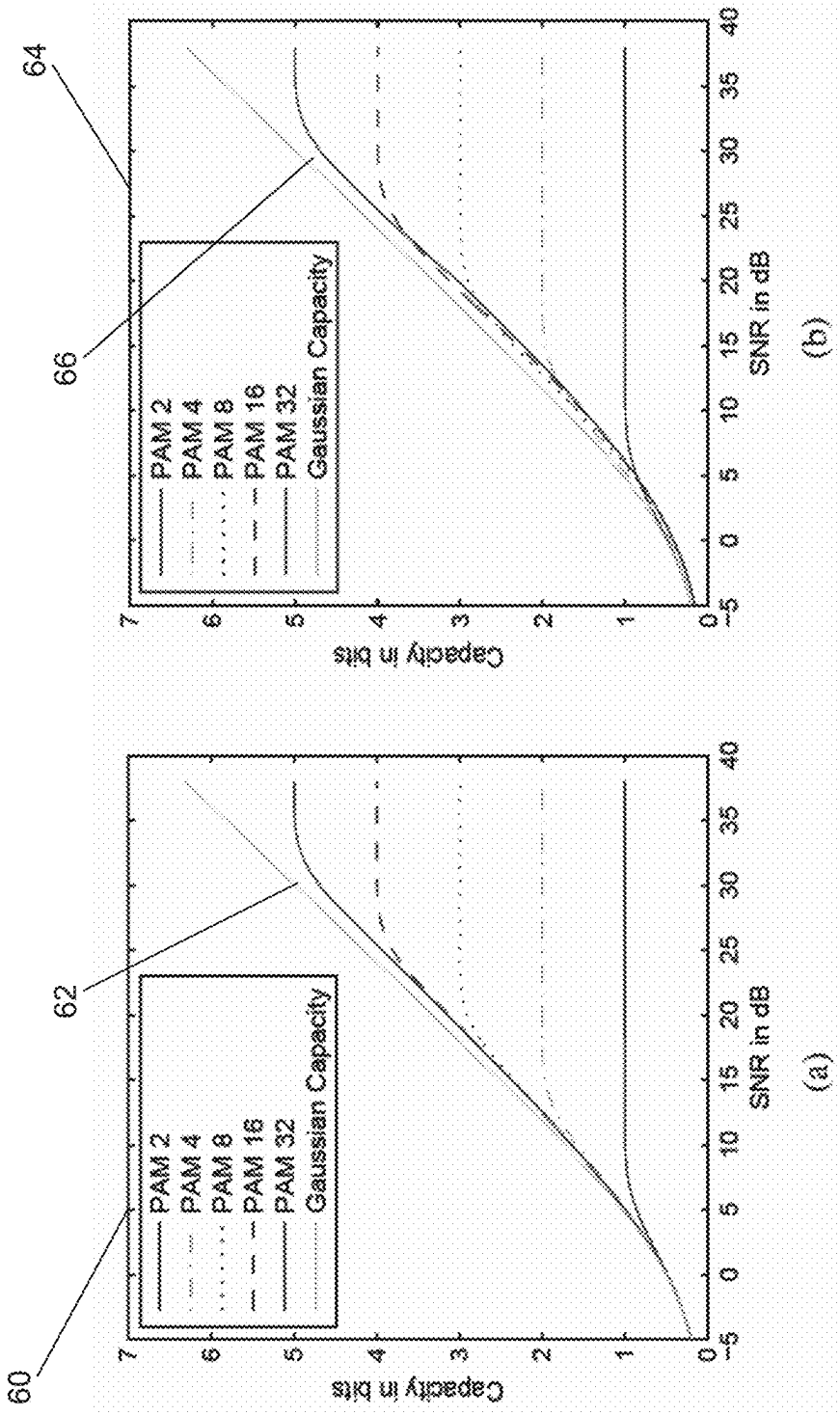

60
62
64
66
PAM 2
PAM 4
PAM 8
PAM 16
PAM 32
Gaussian Capacity
Capacity in bits
SNR in dB
(a)
(b)

FIG. 6a

FIG. 6b

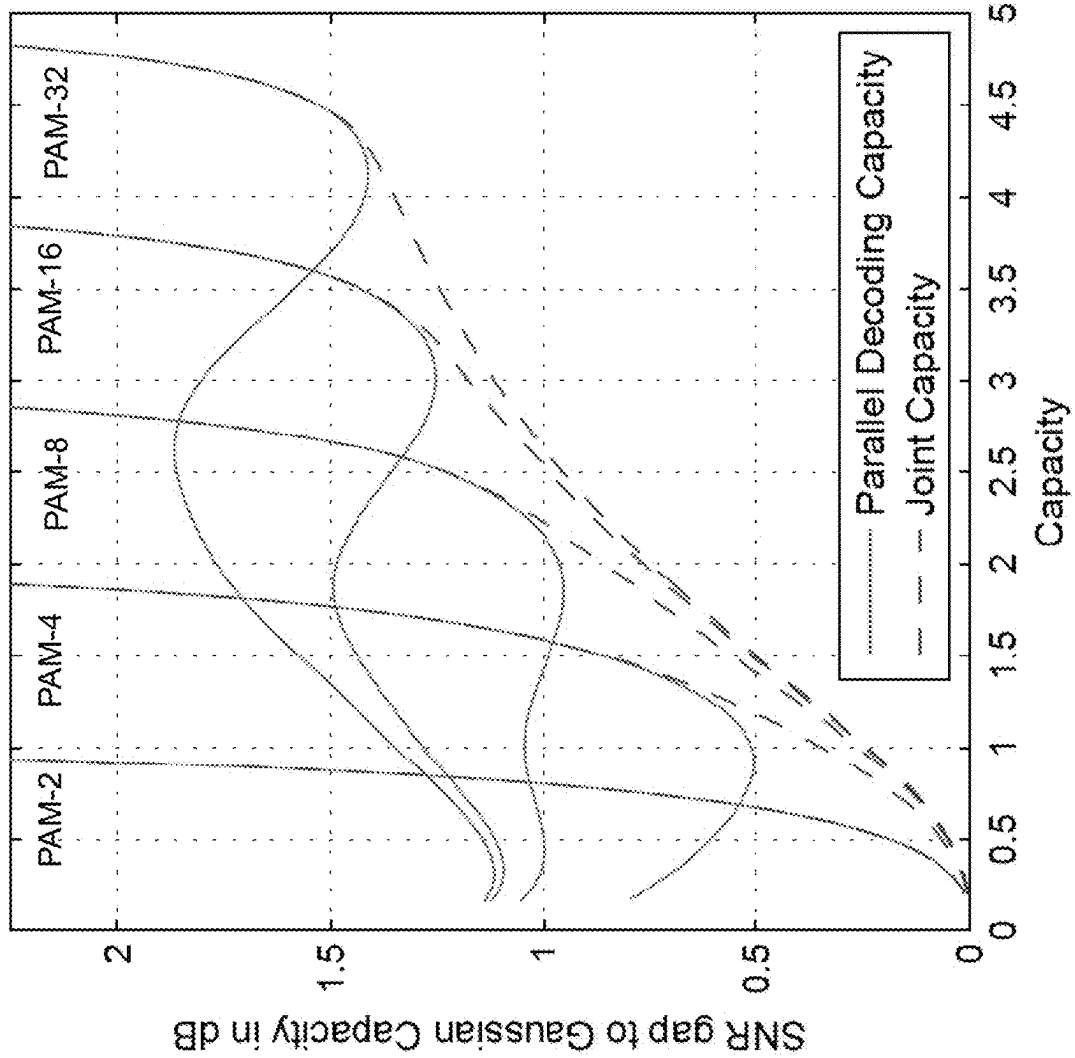

PAM-2
PAM-4
PAM-8
PAM-16
PAM-32
Parallel Decoding Capacity
Joint Capacity
SNR gap to Gaussian Capacity in dB
Capacity
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5

FIG. 7

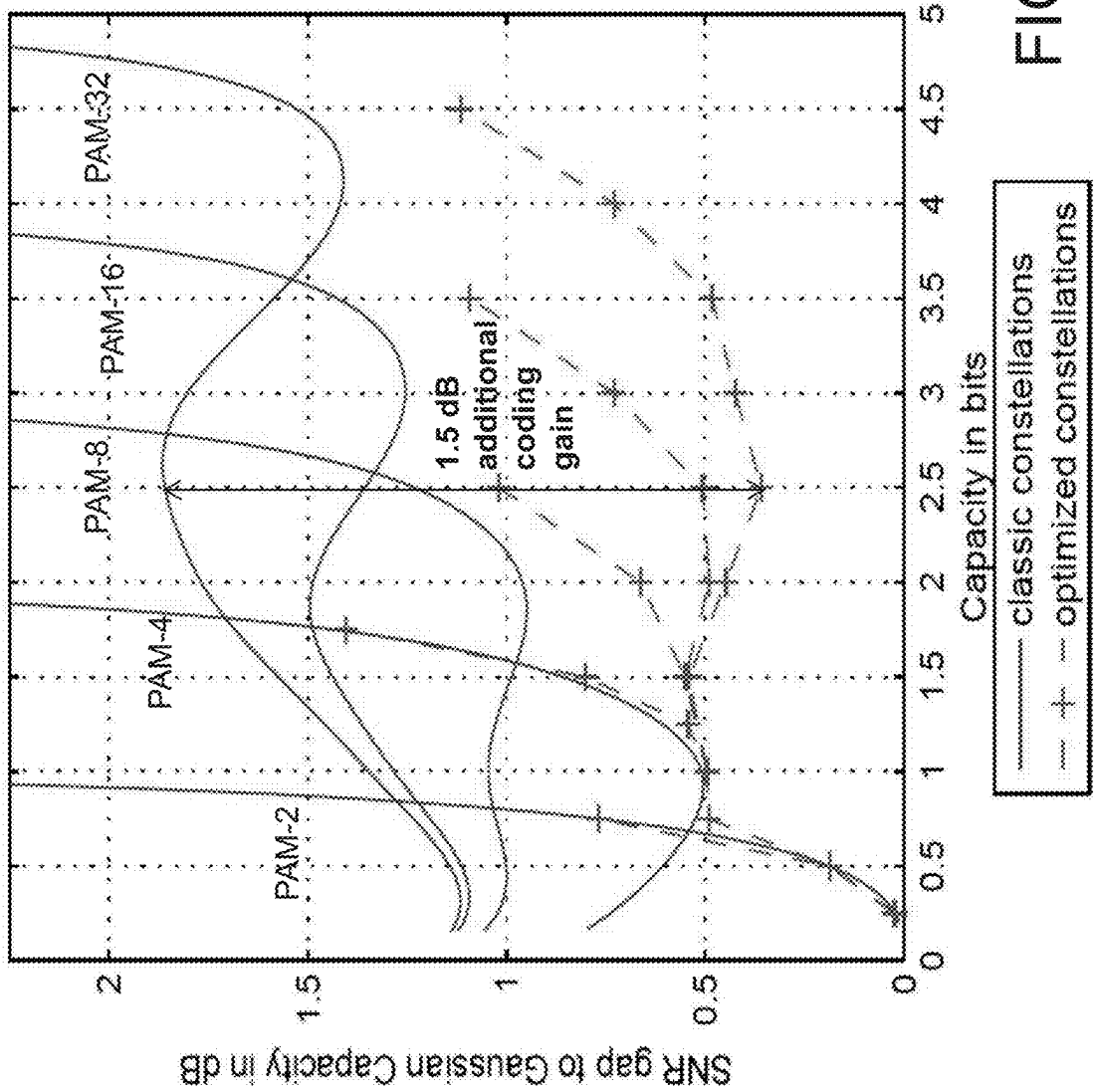

SNR gap to Gaussian Capacity in dB
2
1.5
1
0.5
0
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
Capacity in bits
PAM-2
PAM-4
PAM-8
PAM-16
PAM-32
1.5 dB
additional
coding
gain
classic constellations
optimized constellations

FIG. 8a

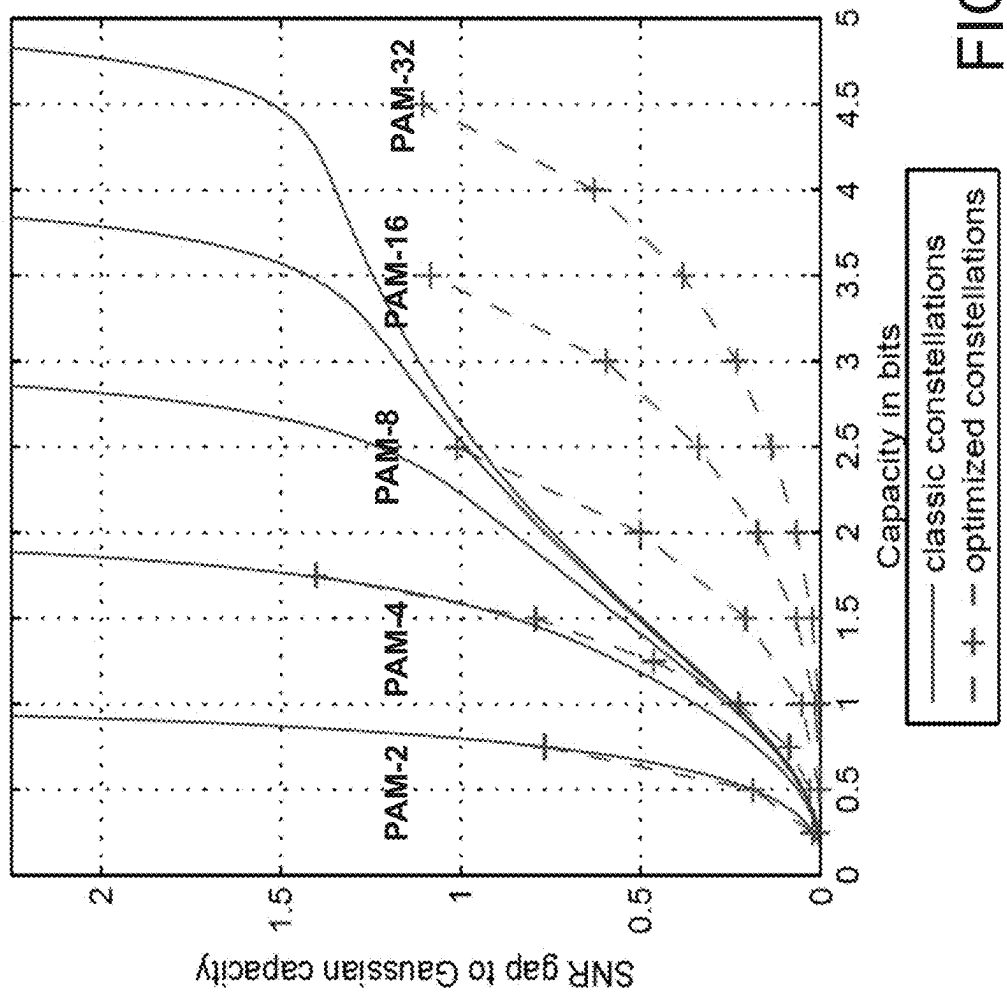

SNR gap to Gaussian capacity
Capacity in bits
PAM-2
PAM-4
PAM-8
PAM-16
PAM-32
classic constellations
optimized constellations
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5

FIG. 8b

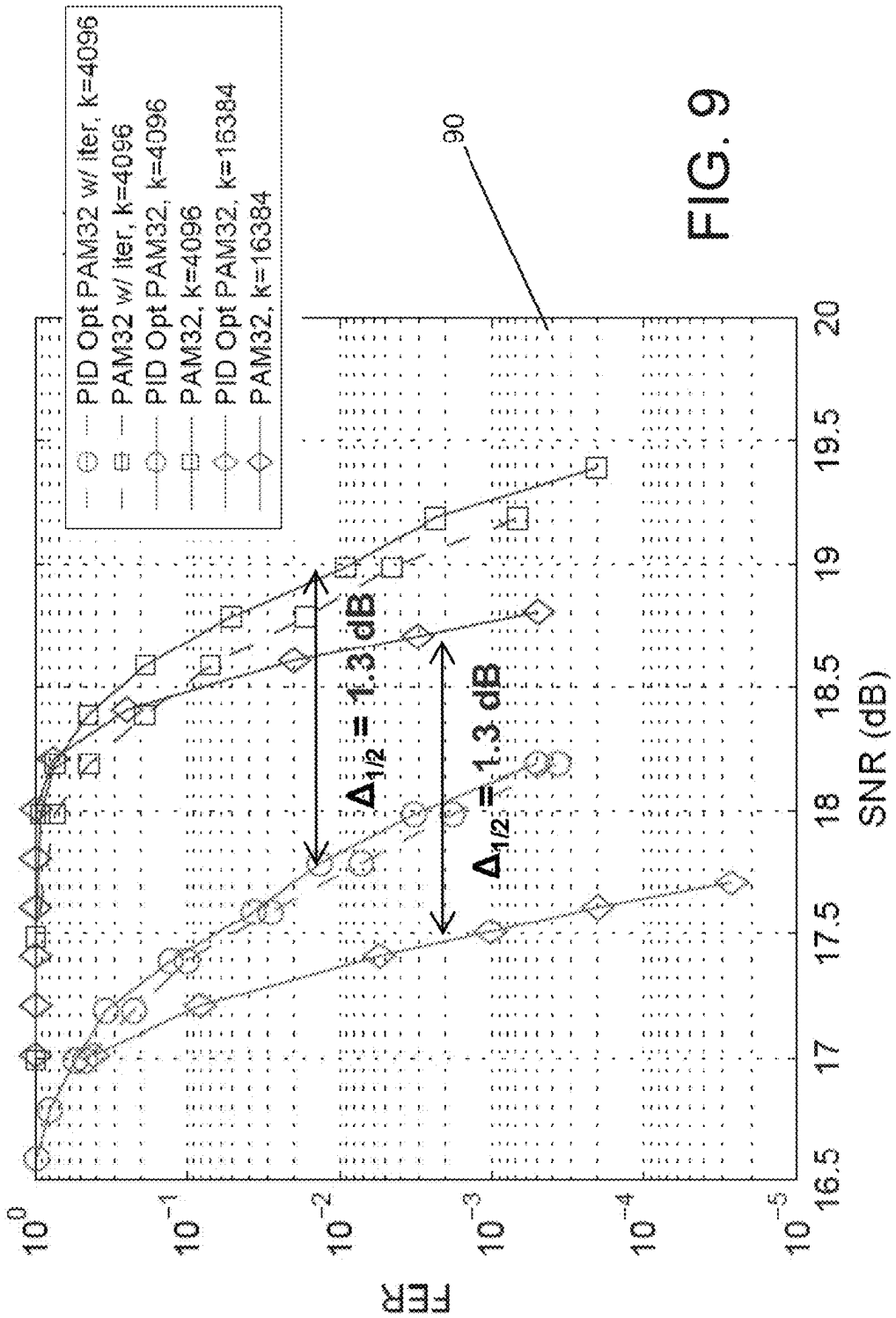

PID Opt PAM32 w/ iter, k=4096
PAM32 w/ iter, k=4096
PID Opt PAM32, k=4096
PAM32, k=4096
PID Opt PAM32, k=16384
PAM32, k=16384
90
$\Delta_{1/2}$ = 1.3 dB
$\Delta_{1/2}$ = 1.3 dB
FER
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
16.5
17
17.5
18
18.5
19
19.5
20
SNR (dB)

FIG. 9

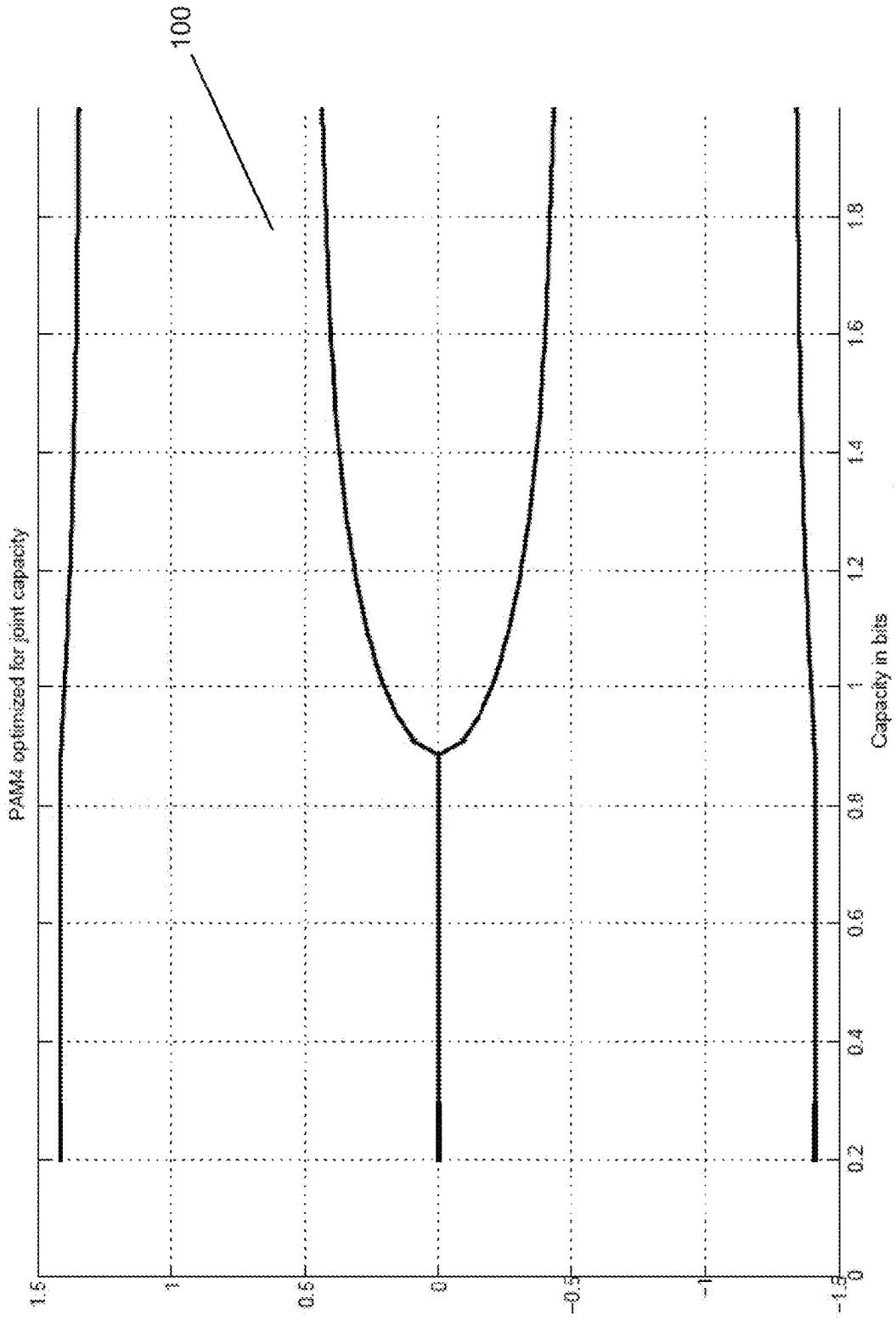

100
PAM4 optimized for joint capacity
1.5
1
0.5
0
-0.5
-1
-1.5
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
Capacity in bits

FIG. 10a

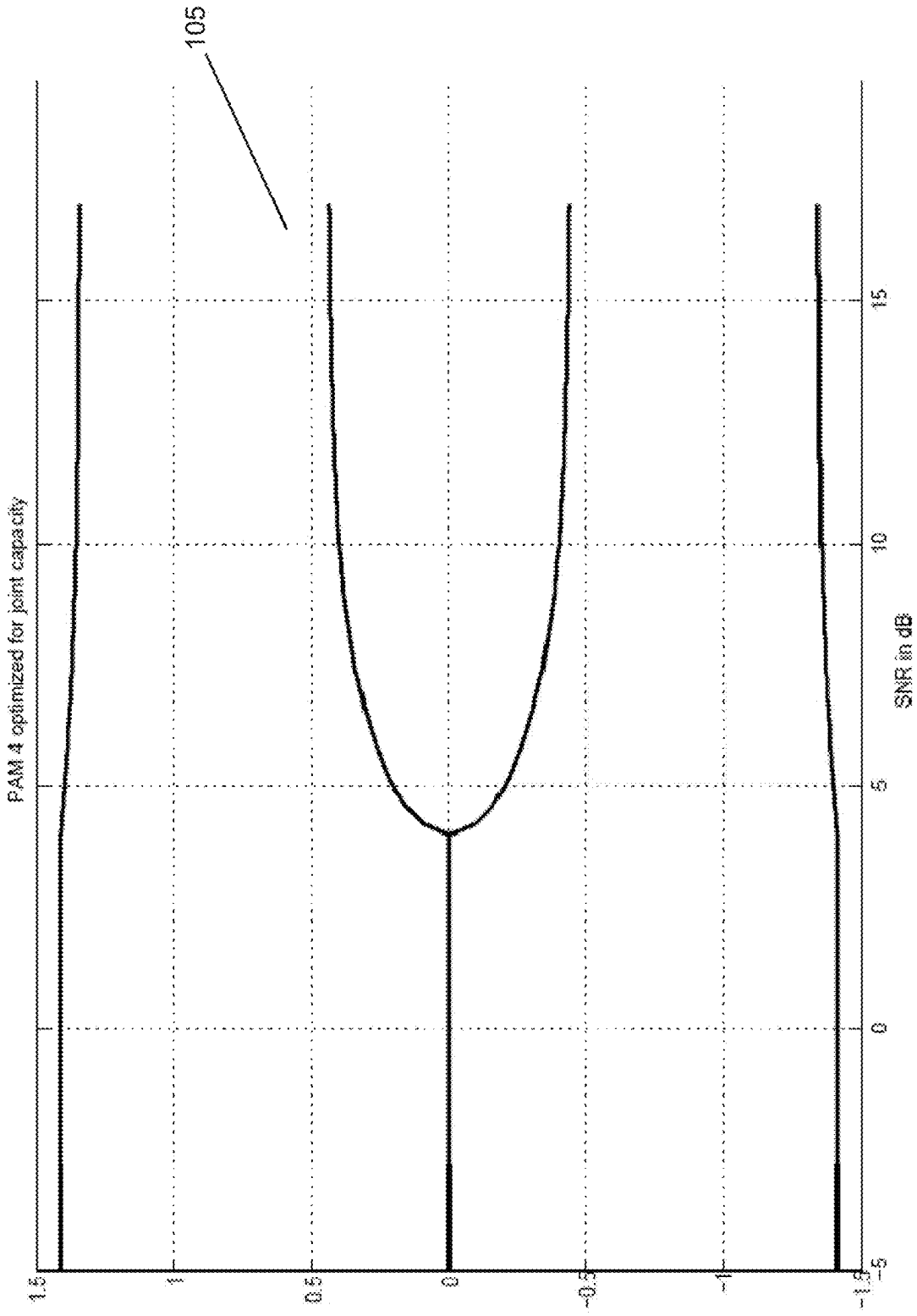

105
PAM 4 optimized for joint capacity
1.5
1
0.5
0
-0.5
-1
-1.5
-5
0
5
10
15
SNR in dB

FIG. 10b

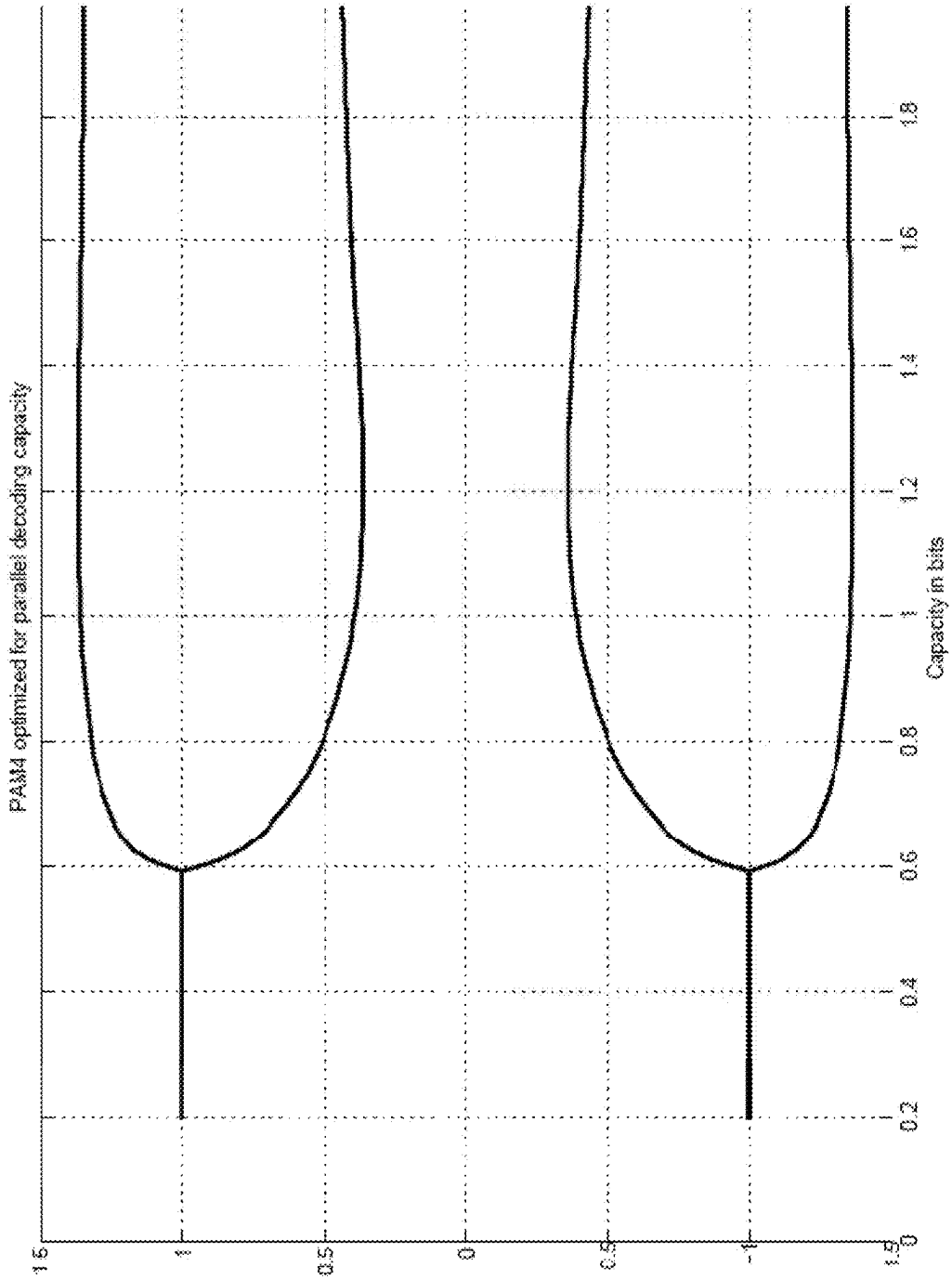

PAM4 optimized for parallel decoding capacity
1.5
1
0.5
0
-0.5
-1
-1.5
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
Capacity in bits

FIG. 10c

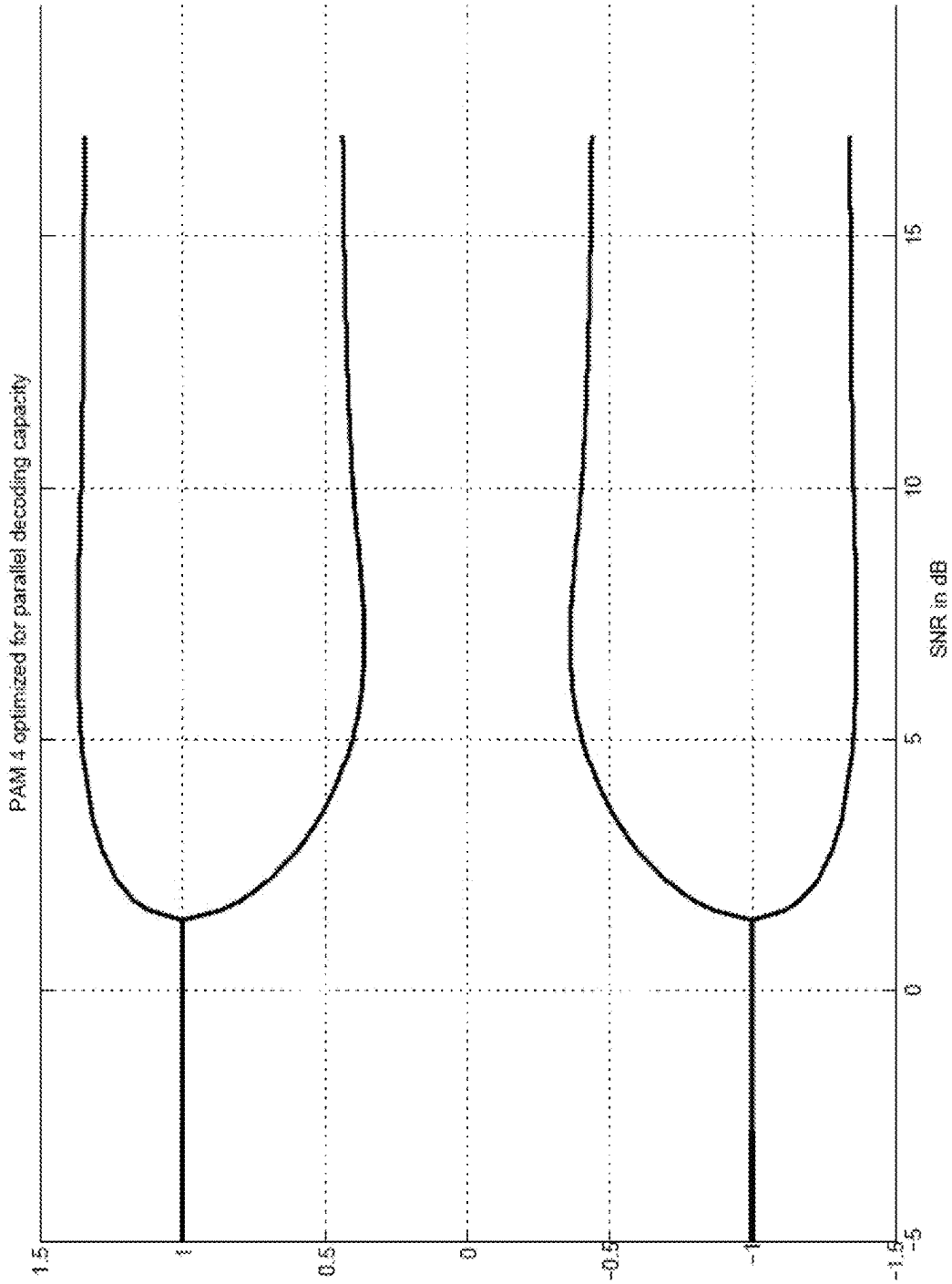

PAM 4 optimized for parallel decoding capacity
1.5
1
0.5
0
-0.5
-1
-1.5
-5
0
5
10
15
SNR in dB

FIG. 10d

PAM-4 constellations optimized for joint capacity at different rates

(bps)	0.50	0.75	1.00	1.25	1.50
(SNR)	0.03	2.71	5.00	7.15	9.24
x_0	-1.41	-1.41	-1.40	-1.37	-1.36
x_1	0.00	0.00	-0.20	-0.33	-0.39
x_2	0.00	0.00	0.20	0.33	0.39
x_3	1.41	1.41	1.40	1.37	1.36

FIG. 11a

PAM-4 constellations optimized for parallel decoding capacity at different

(bps)	0.50	0.75	1.00	1.25	1.50
(SNR)	0.19	3.11	5.26	7.22	9.25
x_0	-1.00	-1.30	-1.36	-1.37	-1.36
x_1	-1.00	-0.56	-0.39	-0.33	-0.39
x_2	1.00	1.30	1.36	0.33	1.36
x_3	1.00	0.56	0.39	1.37	0.39

FIG. 11b

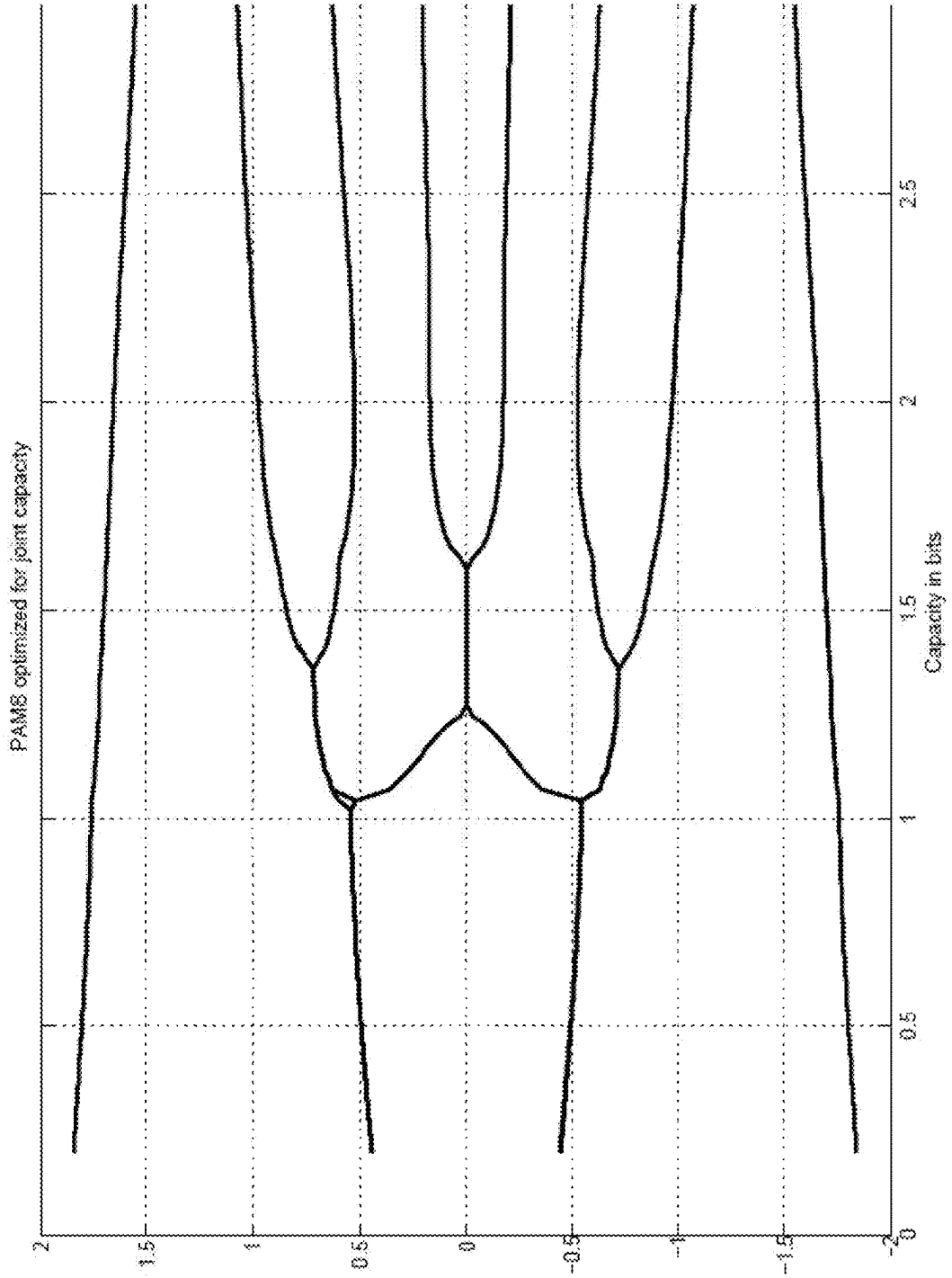

PAM8 optimized for joint capacity
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
0
0.5
1
1.5
2
2.5
Capacity in bits

FIG. 12a

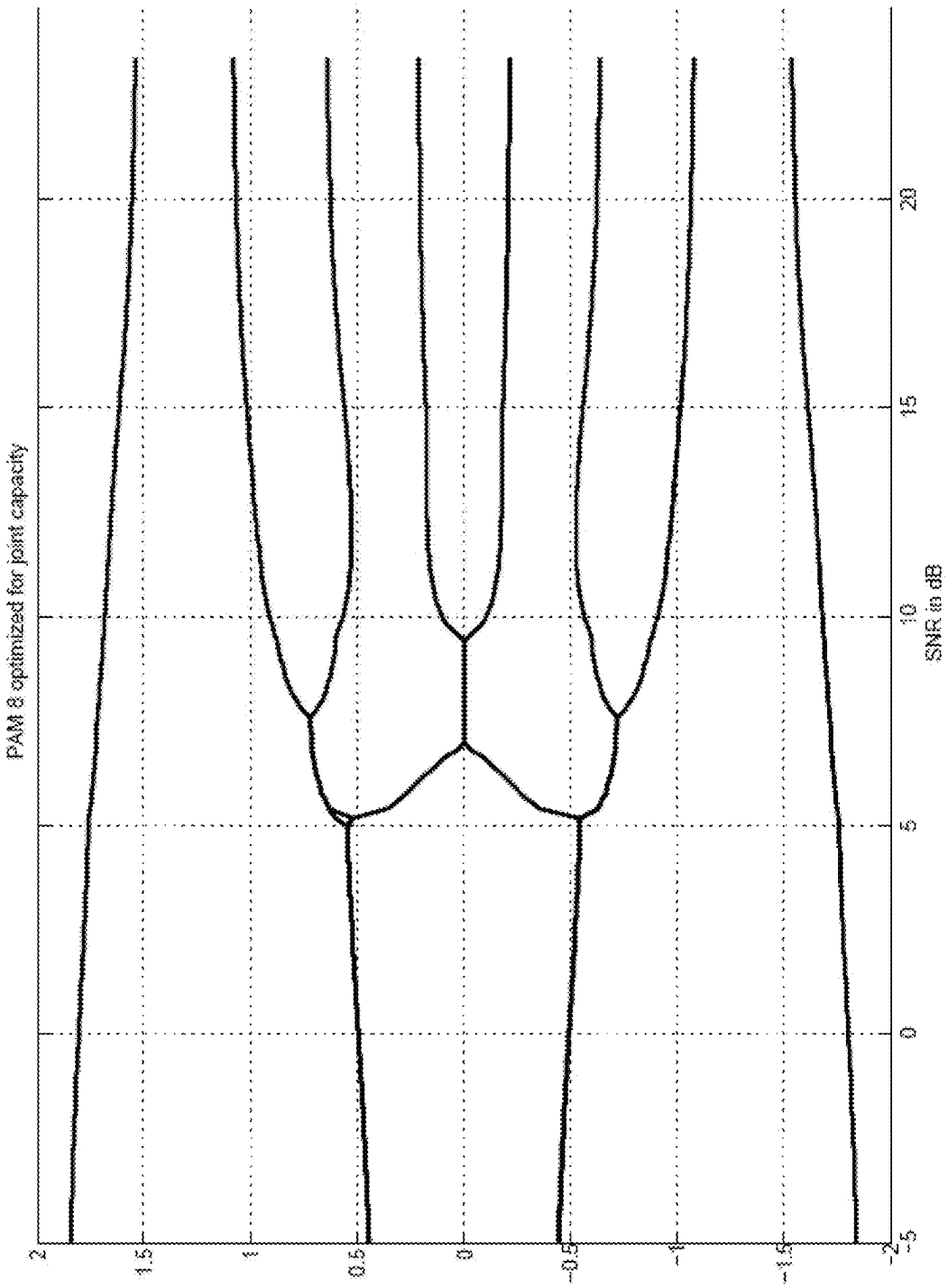

PAM 8 optimized for joint capacity
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
-5
0
5
10
15
20
SNR in dB

FIG. 12b

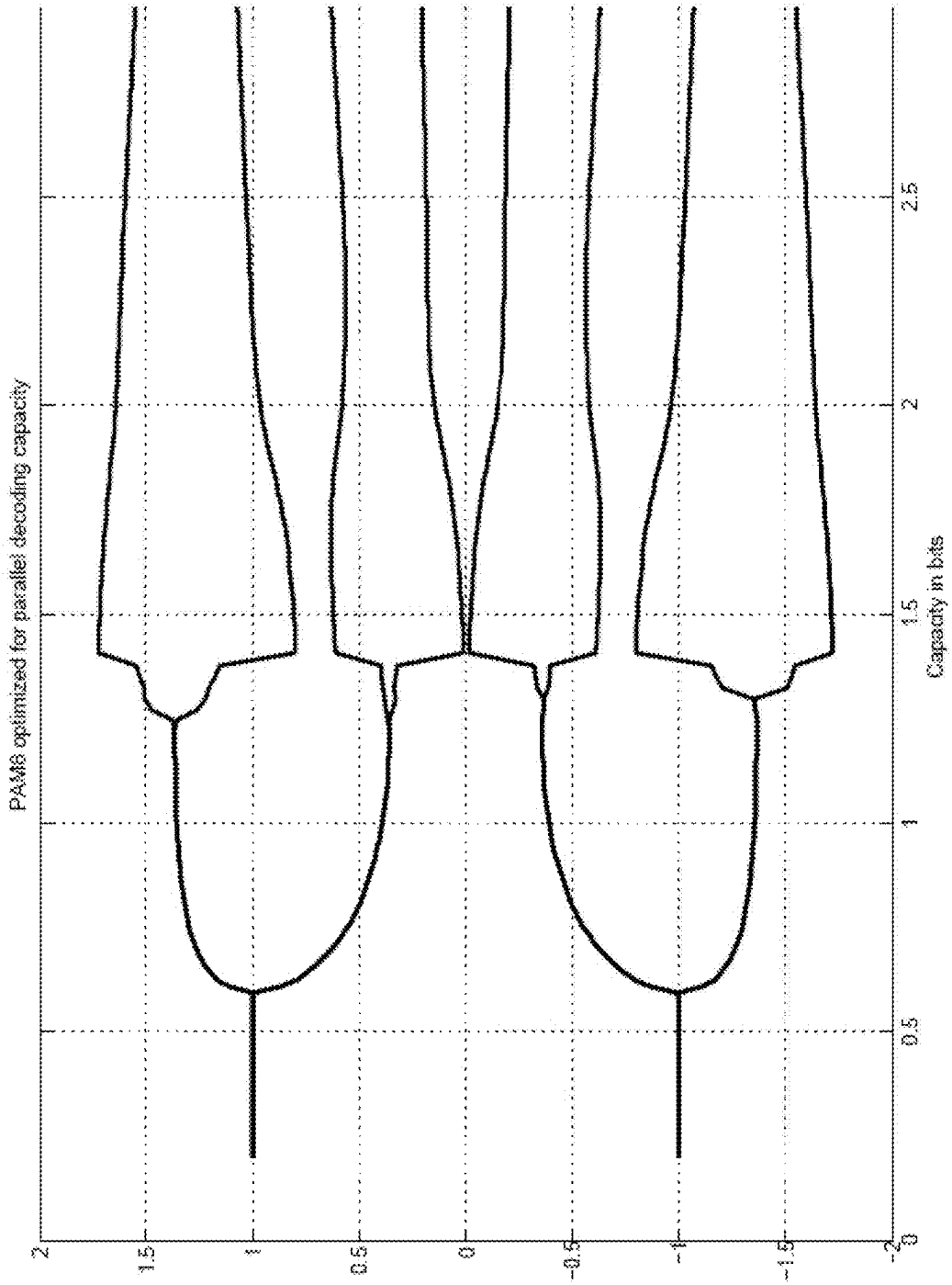

PAM8 optimized for parallel decoding capacity
Capacity in bits
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
0
0.5
1
1.5
2
2.5

FIG. 12c

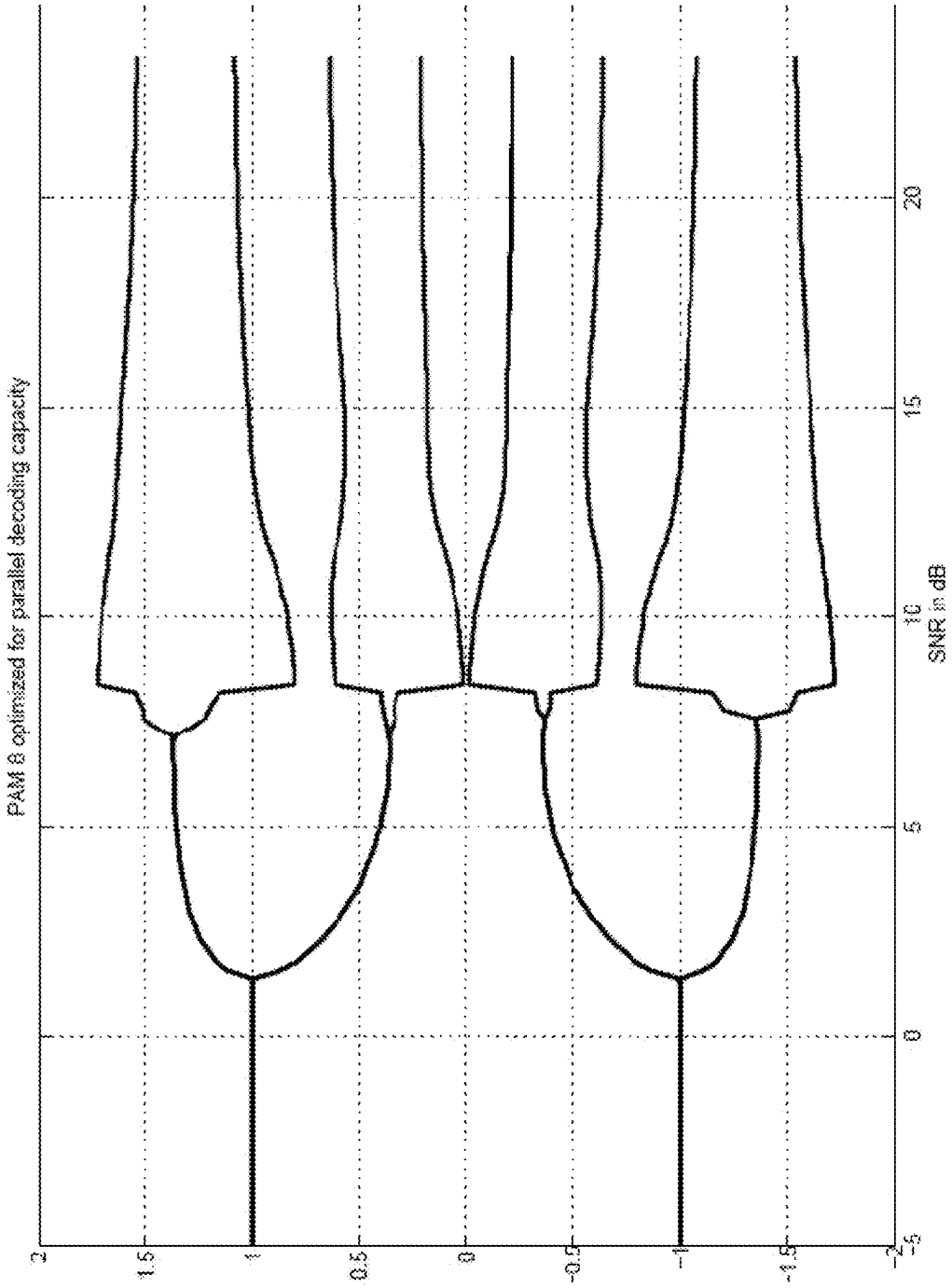

PAM 8 optimized for parallel decoding capacity
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
-5
0
5
10
15
20
SNR in dB

FIG. 12d

PAM-8 constellations optimized for joint capacity at different rates

(bps)	0.5	1.0	1.5	2.0	2.5
(SNR)	0.00	4.82	8.66	12.26	15.93
x_0	-1.81	-1.76	-1.70	-1.66	-1.60
x_1	-0.50	-0.55	-0.84	-0.97	-1.03
x_2	-0.50	-0.55	-0.63	-0.53	-0.58
x_3	-0.50	-0.55	-0.00	-0.17	-0.19
x_4	0.50	0.55	0.00	0.17	0.19
x_5	0.50	0.55	0.63	0.53	0.58
x_6	0.50	0.55	0.84	0.97	1.03
x_7	1.81	1.76	1.70	1.66	1.60

FIG. 13a

PAM-8 constellations optimized for parallel decoding capacity at different

(bps)	0.5	1.0	1.5	2.0	2.5
(SNR)	0.19	5,27	9.00	12.42	15.93
x_0	-1.00	-1.36	-1.72	-1.64	-1.60
x_1	-1.00	-1.36	-0.81	-0.97	-1.03
x_2	-1.00	-0.39	1.72	1.64	-0.19
x_3	-1.00	-0.39	-0.62	-0.58	-0.58
x_4	1.00	1.36	0.62	0.58	1.60
x_5	1.00	1.36	0.02	0.15	1.03
x_6	1.00	0.39	0.81	0.97	0.19
x_7	1.00	0.39	-0.02	-0.15	0.58

FIG. 13b

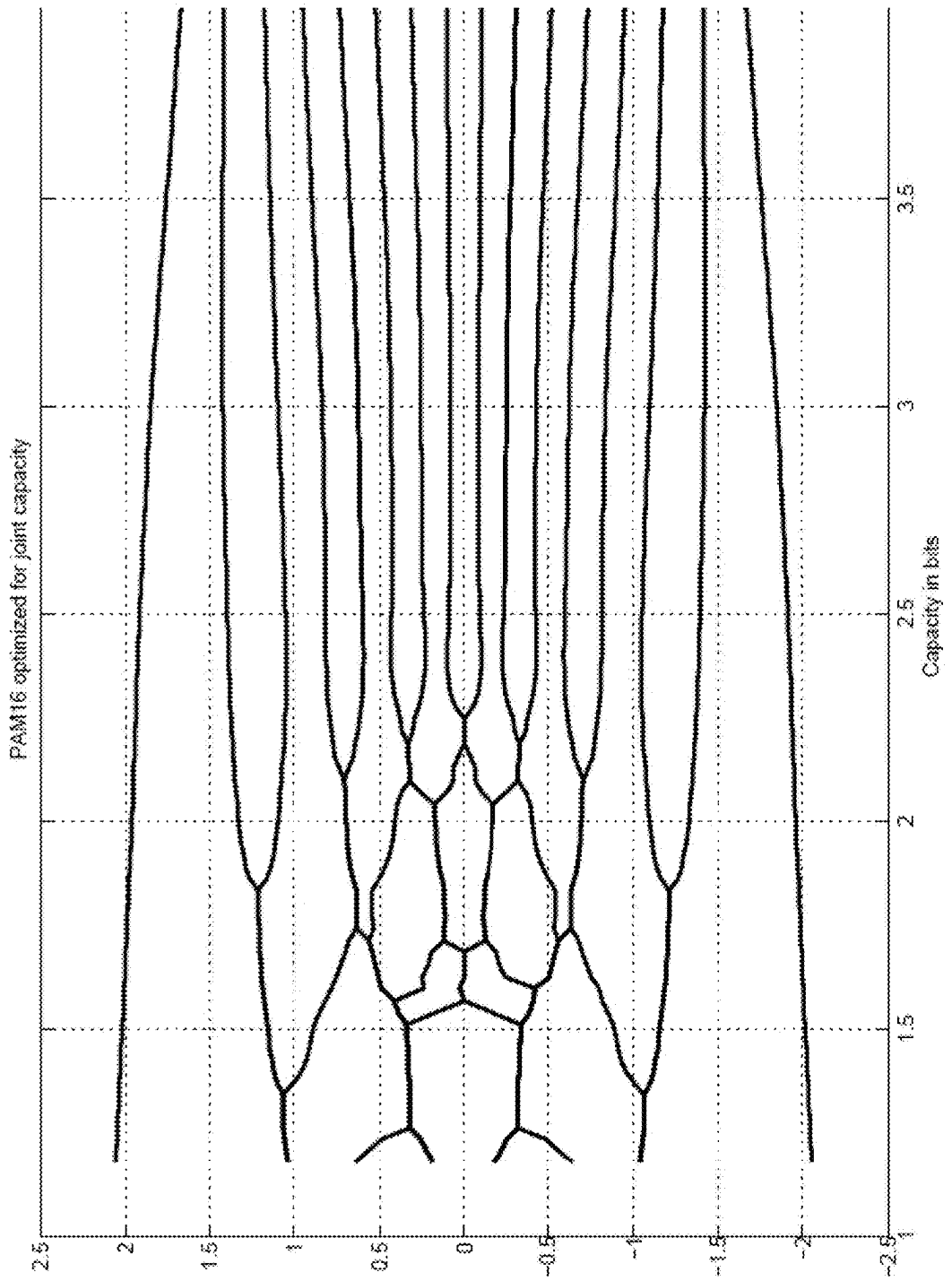

PAM16 optimized for joint capacity
Capacity in bits
2.5
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
-2.5
1
1.5
2
2.5
3
3.5

FIG. 14a

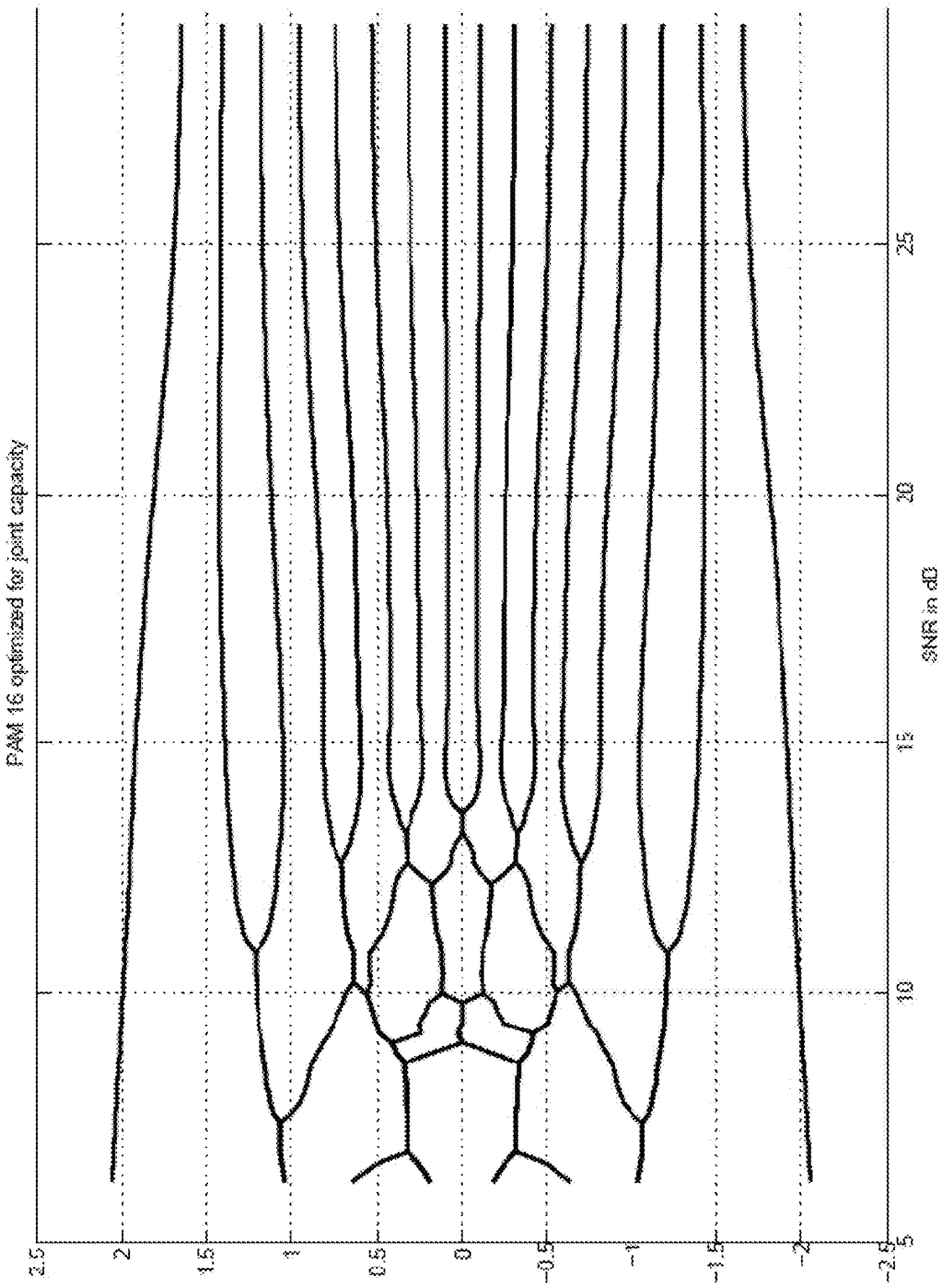

PAM 16 optimized for joint capacity
2.5
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
-2.5
-5
10
15
20
25
SNR in dB

FIG. 14b

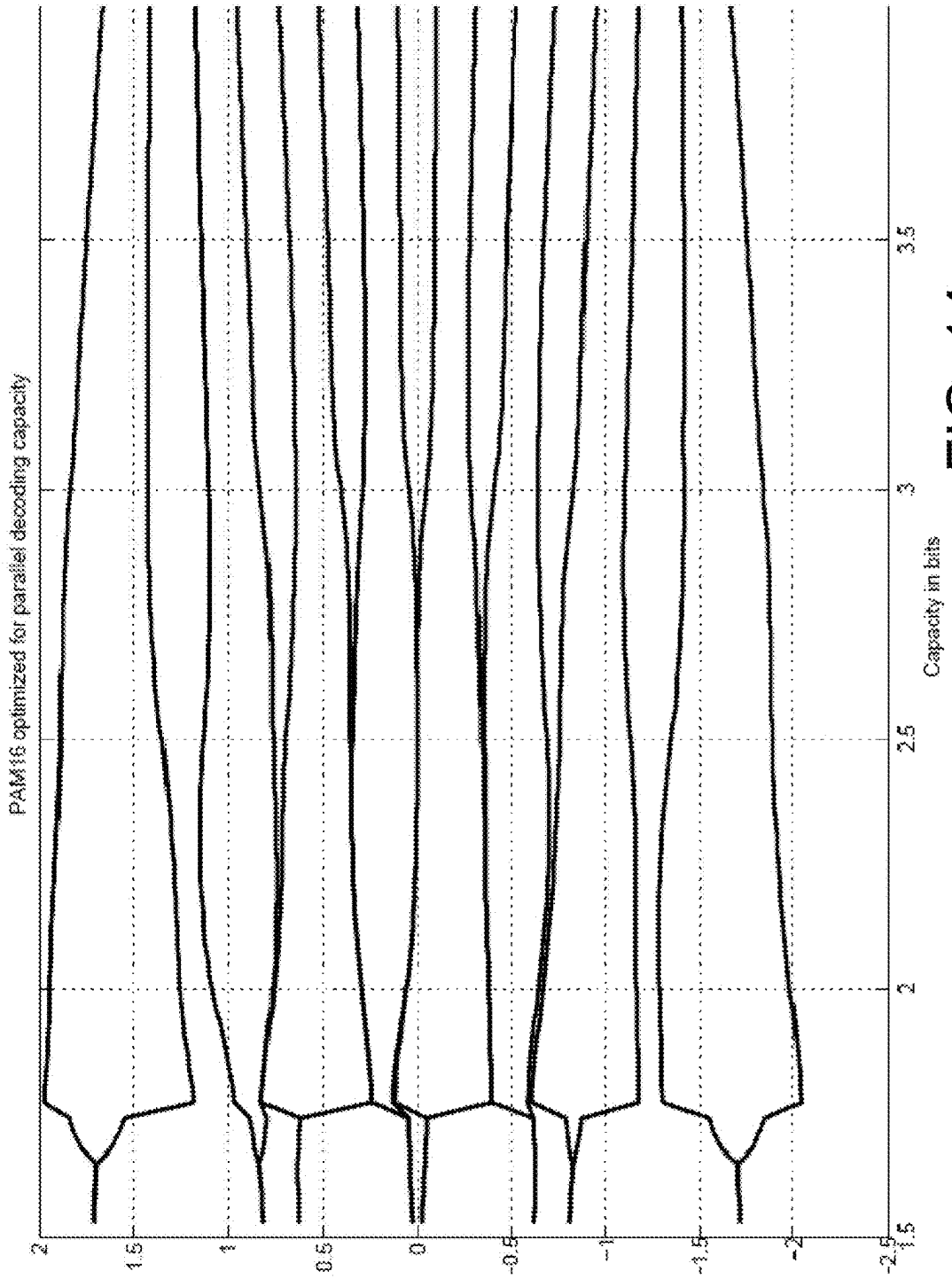

PAM16 optimized for parallel decoding capacity
Capacity in bits
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
-2.5
1.5
2
2.5
3
3.5

FIG. 14c

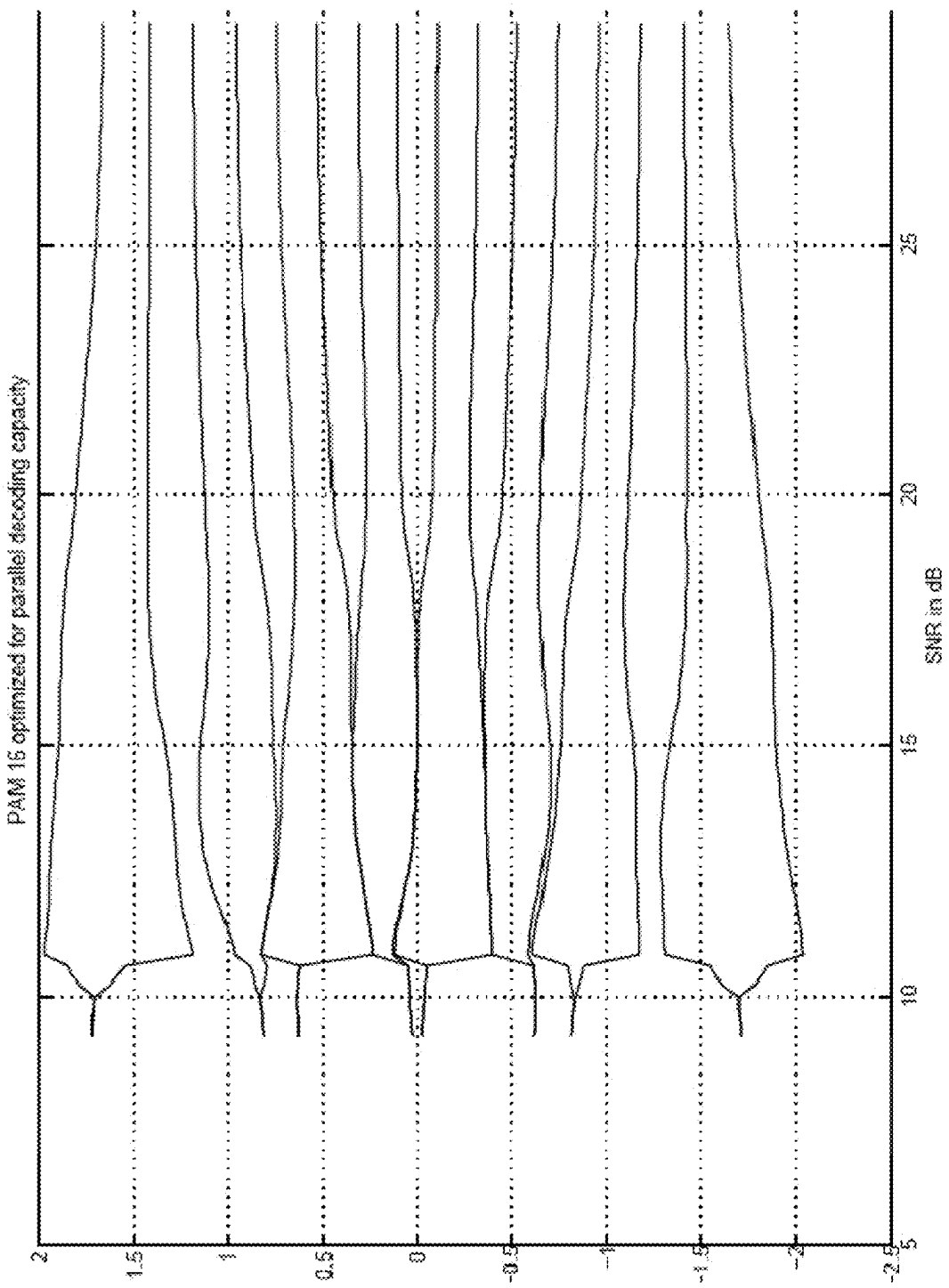

PAM 16 optimized for parallel decoding capacity
SNR in dB
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
-2.5
5
10
15
20
25

FIG. 14d

PAM-16 constellations optimized for joint capacity at different rates

(bps)	1.5	2.0	2.5	3.0	3.5
(SNR)	8.52	11.94	15.25	18.60	22.12
x_0	-2.02	-1.96	-1.91	-1.85	-1.76
x_1	-1.16	-1.33	-1.40	-1.42	-1.42
x_2	-1.16	-1.10	-1.05	-1.10	-1.15
x_3	-0.90	-0.69	-0.82	-0.84	-0.90
x_4	-0.34	-0.69	-0.60	-0.62	-0.68
x_5	-0.34	-0.40	-0.43	-0.43	-0.47
x_6	-0.34	-0.17	-0.24	-0.26	-0.28
x_7	-0.34	-0.17	-0.09	-0.08	-0.09
x_8	0.34	0.17	0.09	0.08	0.09
x_9	0.34	0.17	0.24	0.26	0.28
x_{10}	0.34	0.40	0.43	0.43	0.47
x_{11}	0.34	0.69	0.60	0.62	0.68
x_{12}	0.90	0.69	0.82	0.84	0.90
x_{13}	1.16	1.10	1.05	1.10	1.15
x_{14}	1.16	1.33	1.40	1.42	1.42
x_{15}	2.02	1.96	1.91	1.85	1.76

FIG. 15a

PAM-16 constellations optimized for parallel decoding capacity at different

(bps)	1.5	2.0	2.5	3.0	3.5
(SNR)	9.00	12.25	15.42	18.72	22.13
x_0	-1.72	-1.98	-1.89	-1.84	-1.75
x_1	-1.72	-1.29	-1.36	-1.42	-1.42
x_2	-0.81	1.94	1.89	1.84	1.75
x_3	-0.81	-1.17	-1.14	-1.11	-1.15
x_4	1.72	-0.38	-0.35	-0.40	-0.47
x_5	1.72	-0.65	-0.70	-0.65	-0.68
x_6	-0.62	-0.38	-0.34	-0.29	-0.28
x_7	-0.62	-0.68	-0.76	-0.83	-0.90
x_8	0.62	1.09	1.13	1.11	1.15
x_9	0.62	0.76	0.76	0.84	0.90
x_{10}	0.02	1.26	1.35	1.42	1.42
x_{11}	0.02	0.76	0.70	0.65	0.68
x_{12}	0.81	0.06	0.00	0.05	0.09
x_{13}	0.81	0.29	0.34	0.29	0.28
x_{14}	-0.02	0.06	0.00	-0.05	-0.09
x_{15}	-0.02	0.29	0.35	0.40	0.47

FIG. 15b

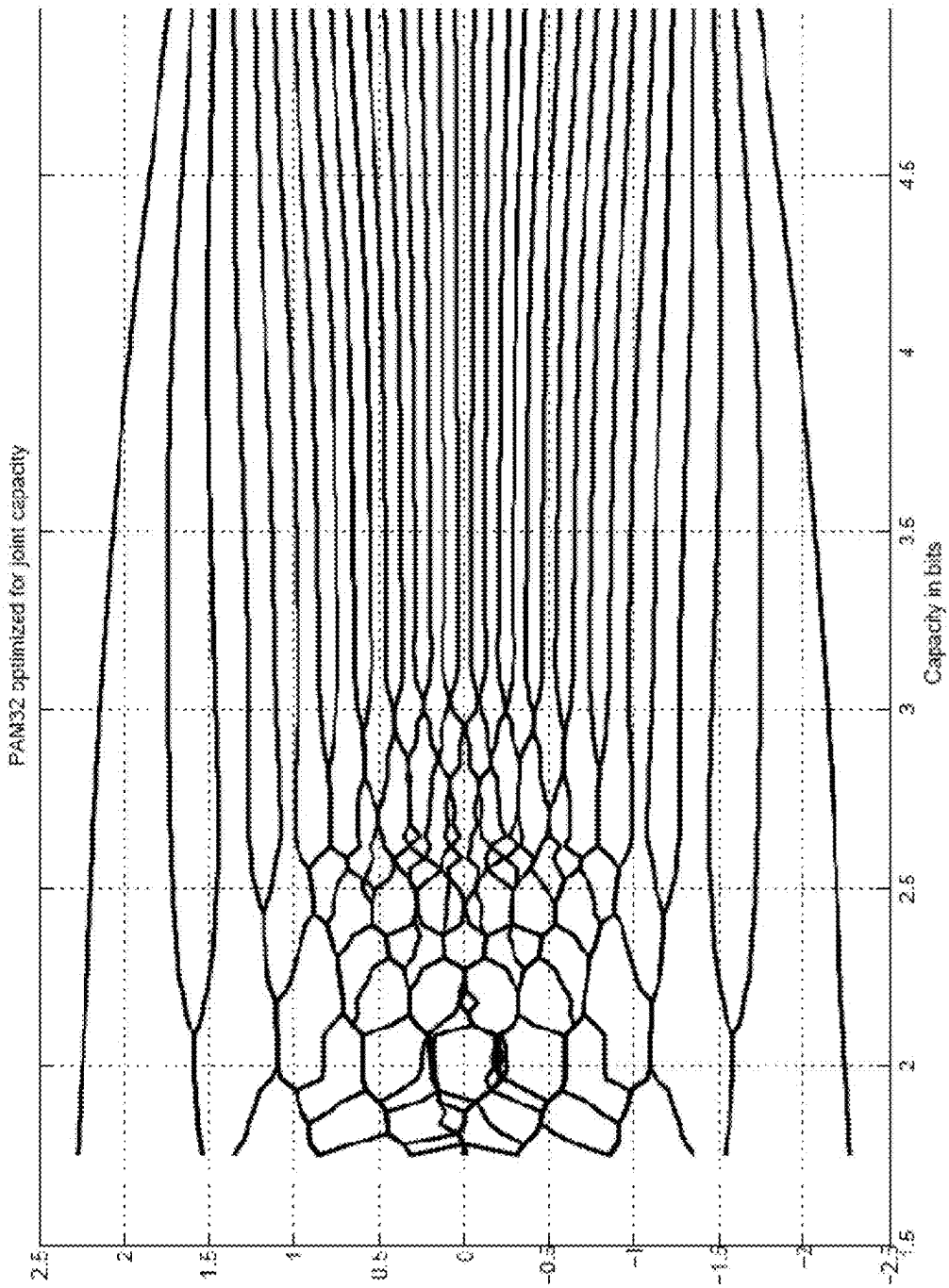

PAM32 optimized for joint capacity
Capacity in bits
2.5
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
-2.5
1.5
2
2.5
3
3.5
4
4.5

FIG. 16a

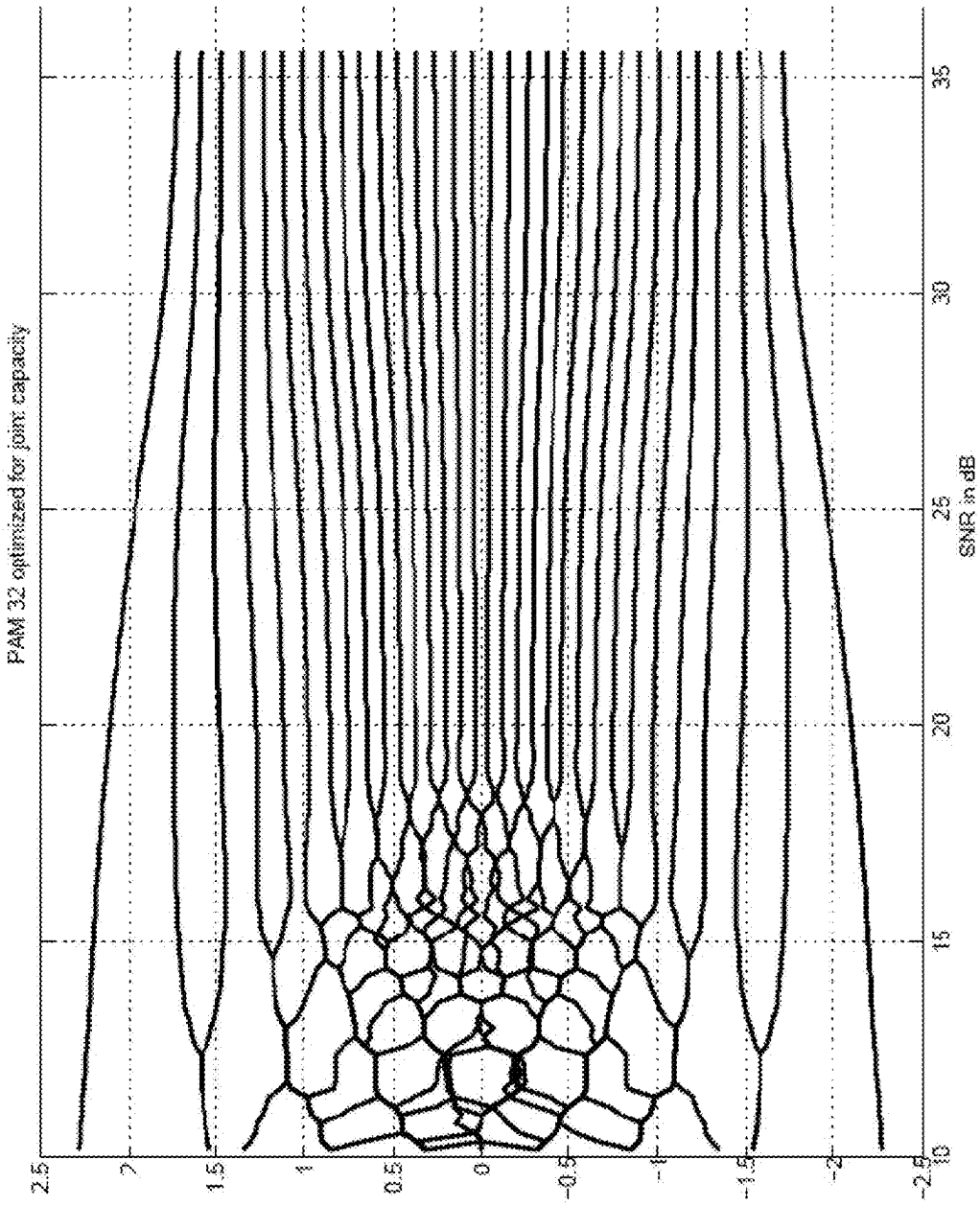

PAM 32 optimized for joint capacity
2.5
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
-2.5
10
15
20
25
30
35
SNR in dB

FIG. 16b

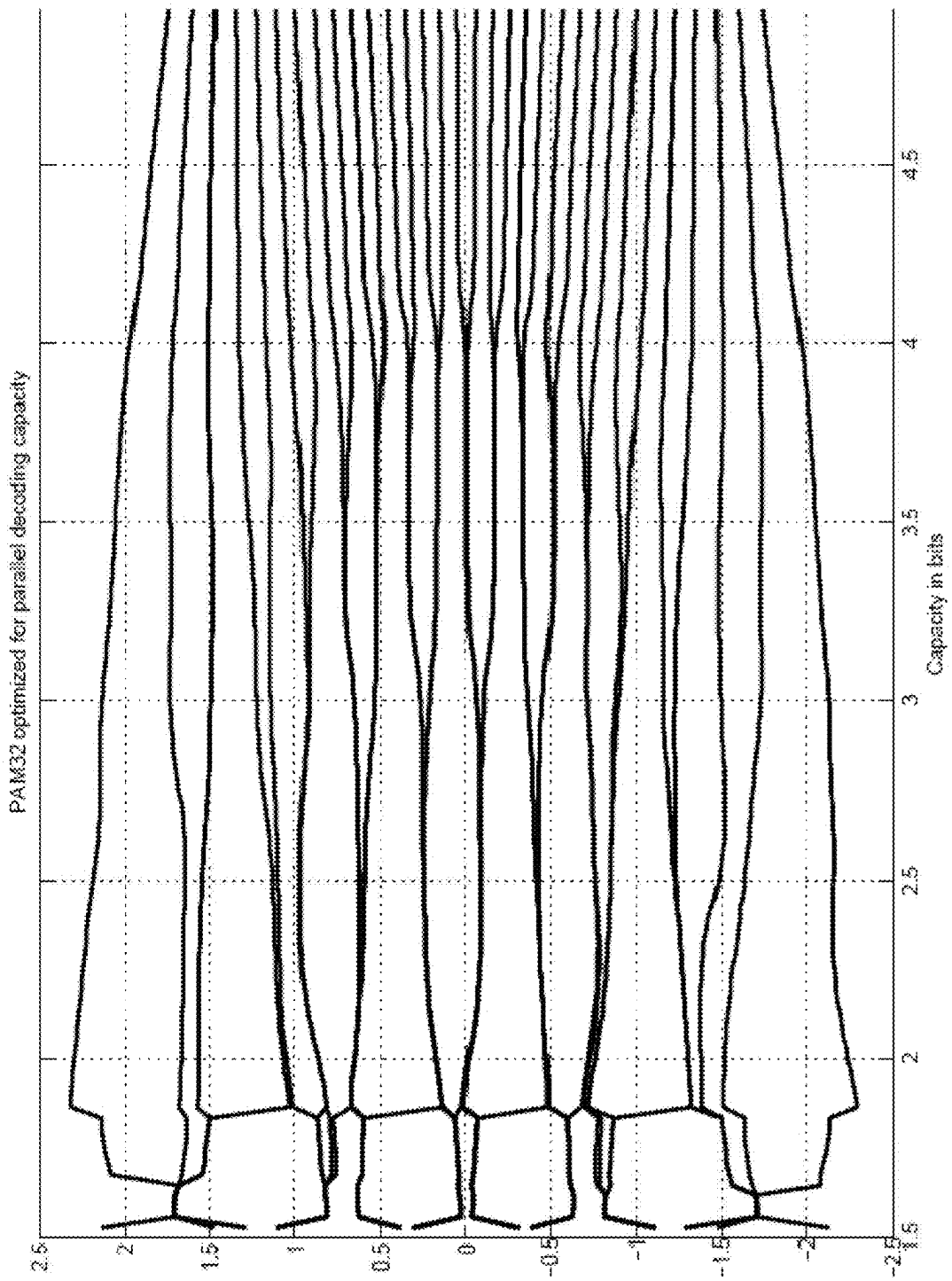

PAM32 optimized for parallel decoding capacity
Capacity in bits
2.5
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
-2.5
1.5
2
2.5
3
3.5
4
4.5

FIG. 16c

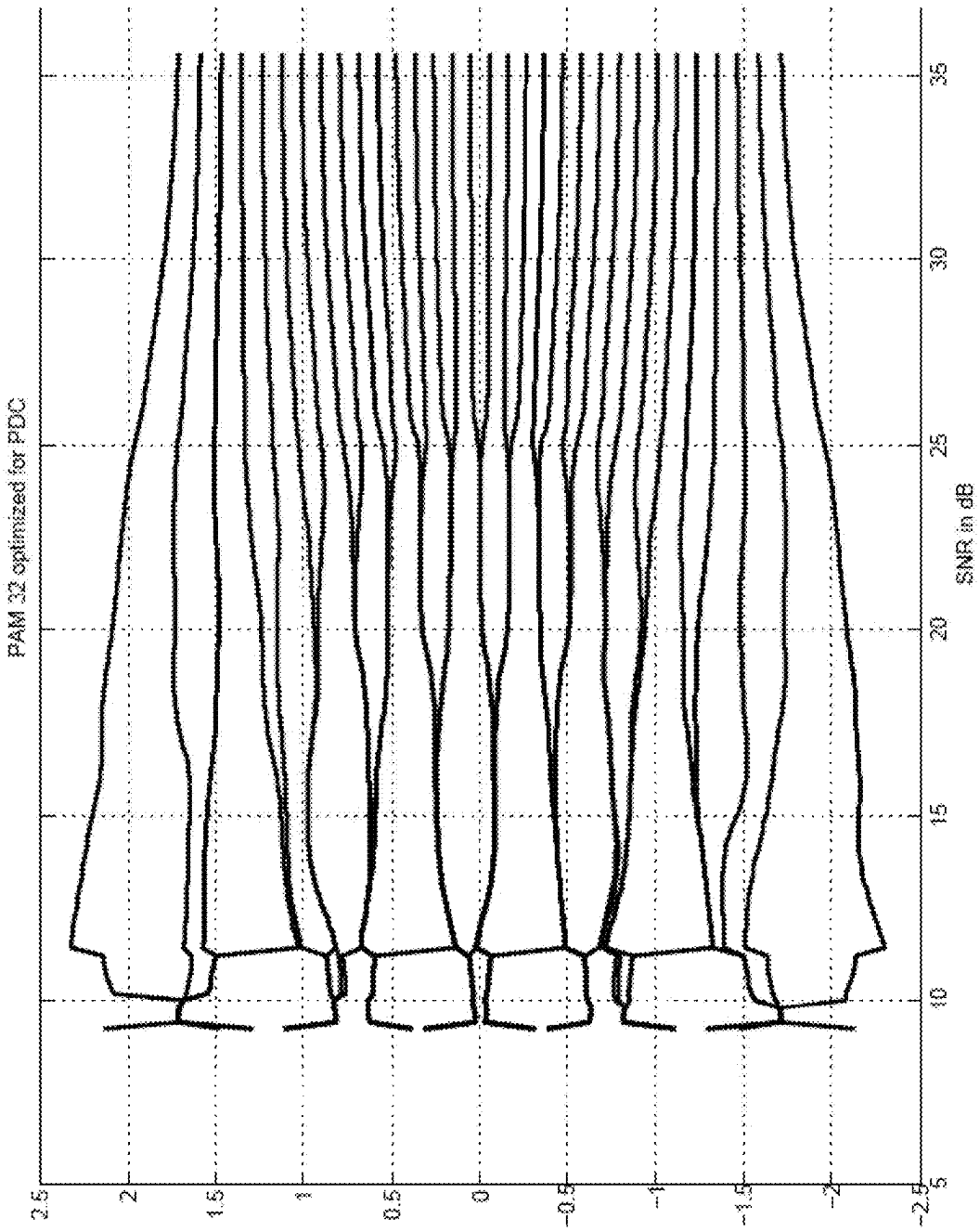

PAM 32 optimized for PDC
SNR in dB
2.5
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
-2.5
5
10
15
20
25
30
35

FIG. 16d

PAM-32 constellations optimized for joint capacity at different rates

(bps)	2.0	2.5	3.0	3.5	4.0	4.5
(SNR)	11.83	15.05	18.23	21.42	24.69	28.19
x_0	-2.25	-2.19	-2.14	-2.07	-1.97	-1.85
x_1	-1.58	-1.71	-1.74	-1.74	-1.72	-1.66
x_2	-1.58	-1.46	-1.46	-1.49	-1.51	-1.50
x_3	-1.10	-1.23	-1.27	-1.29	-1.33	-1.35
x_4	-1.10	-1.13	-1.11	-1.13	-1.17	-1.21
x_5	-1.10	-0.90	-0.98	-0.99	-1.02	-1.08
x_6	-0.83	-0.90	-0.85	-0.87	-0.90	-0.95
x_7	-0.60	-0.75	-0.75	-0.76	-0.78	-0.84
x_8	-0.60	-0.58	-0.63	-0.65	-0.67	-0.73
x_9	-0.60	-0.58	-0.57	-0.56	-0.57	-0.62
x_{10}	-0.60	-0.49	-0.42	-0.46	-0.48	-0.52
x_{11}	-0.24	-0.29	-0.40	-0.38	-0.39	-0.42
x_{12}	-0.21	-0.28	-0.24	-0.29	-0.30	-0.32
x_{13}	-0.20	-0.28	-0.24	-0.21	-0.21	-0.23
x_{14}	-0.20	-0.09	-0.09	-0.12	-0.13	-0.14
x_{15}	-0.16	-0.00	-0.07	-0.04	-0.04	-0.05
x_{16}	0.16	0.00	0.07	0.04	0.04	0.05
x_{17}	0.19	0.09	0.09	0.12	0.13	0.14
x_{18}	0.21	0.28	0.24	0.21	0.21	0.23
x_{19}	0.22	0.28	0.24	0.29	0.30	0.32
x_{20}	0.23	0.28	0.41	0.38	0.39	0.42
x_{21}	0.60	0.49	0.42	0.46	0.48	0.52
x_{22}	0.60	0.58	0.57	0.56	0.57	0.62
x_{23}	0.60	0.58	0.62	0.65	0.67	0.73
x_{24}	0.60	0.75	0.75	0.76	0.78	0.84
x_{25}	0.83	0.90	0.85	0.87	0.90	0.95
x_{26}	1.10	0.90	0.98	0.99	1.02	1.08
x_{27}	1.10	1.13	1.11	1.13	1.17	1.21
x_{28}	1.10	1.23	1.27	1.29	1.33	1.35
x_{29}	1.58	1.46	1.46	1.49	1.51	1.50
x_{30}	1.58	1.71	1.74	1.74	1.72	1.66
x_{31}	2.25	2.19	2.14	2.07	1.97	1.85

FIG. 17a

PAM-32 constellations optimized for parallel decoding capacity at different

(bps)	2.0	2.5	3.0	3.5	4.0	4.5
(SNR)	12.21	15.27	18.42	21.52	24.79	28.20
x_0	-2.25	-2.16	-2.14	-2.05	-1.97	-1.85
x_1	-1.52	-1.64	-1.75	-1.74	-1.72	-1.66
x_2	2.30	2.19	-1.31	2.05	1.97	-1.35
x_3	-1.39	-1.48	-1.43	-1.49	-1.51	-1.49
x_4	1.56	1.54	2.14	-0.96	-1.03	1.85
x_5	-1.31	-1.23	1.75	-1.15	-1.17	1.66
x_6	1.67	1.65	-1.07	-0.91	-0.90	-1.21
x_7	-1.31	-1.24	-1.04	-1.28	-1.33	-1.08
x_8	-0.48	-0.43	-0.36	-0.17	-0.17	-0.42
x_9	-0.72	-0.76	-0.36	-0.34	-0.31	-0.52
x_{10}	-0.48	-0.43	-0.62	-0.17	-0.15	-0.73
x_{11}	-0.73	-0.76	-0.62	-0.34	-0.35	-0.62
x_{12}	-0.48	-0.42	-0.29	-0.71	-0.67	-0.33
x_{13}	-0.76	-0.86	-0.29	-0.52	-0.55	-0.23
x_{14}	-0.48	-0.42	-0.77	-0.72	-0.77	-0.84
x_{15}	-0.76	-0.86	-0.77	-0.52	-0.48	-0.96
x_{16}	0.87	0.98	1.07	1.49	1.51	1.21
x_{17}	0.66	0.63	1.04	1.28	1.33	1.08
x_{18}	0.87	0.98	0.77	1.74	1.72	0.84
x_{19}	0.66	0.63	0.77	1.15	1.17	0.96
x_{20}	1.07	1.13	1.31	0.72	0.77	1.35
x_{21}	0.66	0.59	1.43	0.91	0.90	1.49
x_{22}	1.05	1.10	0.62	0.71	0.67	0.73
x_{23}	0.66	0.60	0.62	0.96	1.03	0.62
x_{24}	-0.01	-0.08	0.02	0.00	0.01	0.05
x_{25}	0.17	0.25	0.02	0.17	0.15	0.14
x_{26}	-0.01	-0.08	0.29	0.00	-0.01	0.33
x_{27}	0.17	0.25	0.29	0.17	0.17	0.23
x_{28}	-0.01	-0.08	-0.02	0.52	0.48	-0.05
x_{29}	0.17	0.25	-0.02	0.34	0.35	-0.14
x_{30}	-0.01	-0.08	0.36	0.52	0.55	0.42
x_{31}	0.17	0.25	0.36	0.34	0.31	0.52

FIG. 17b

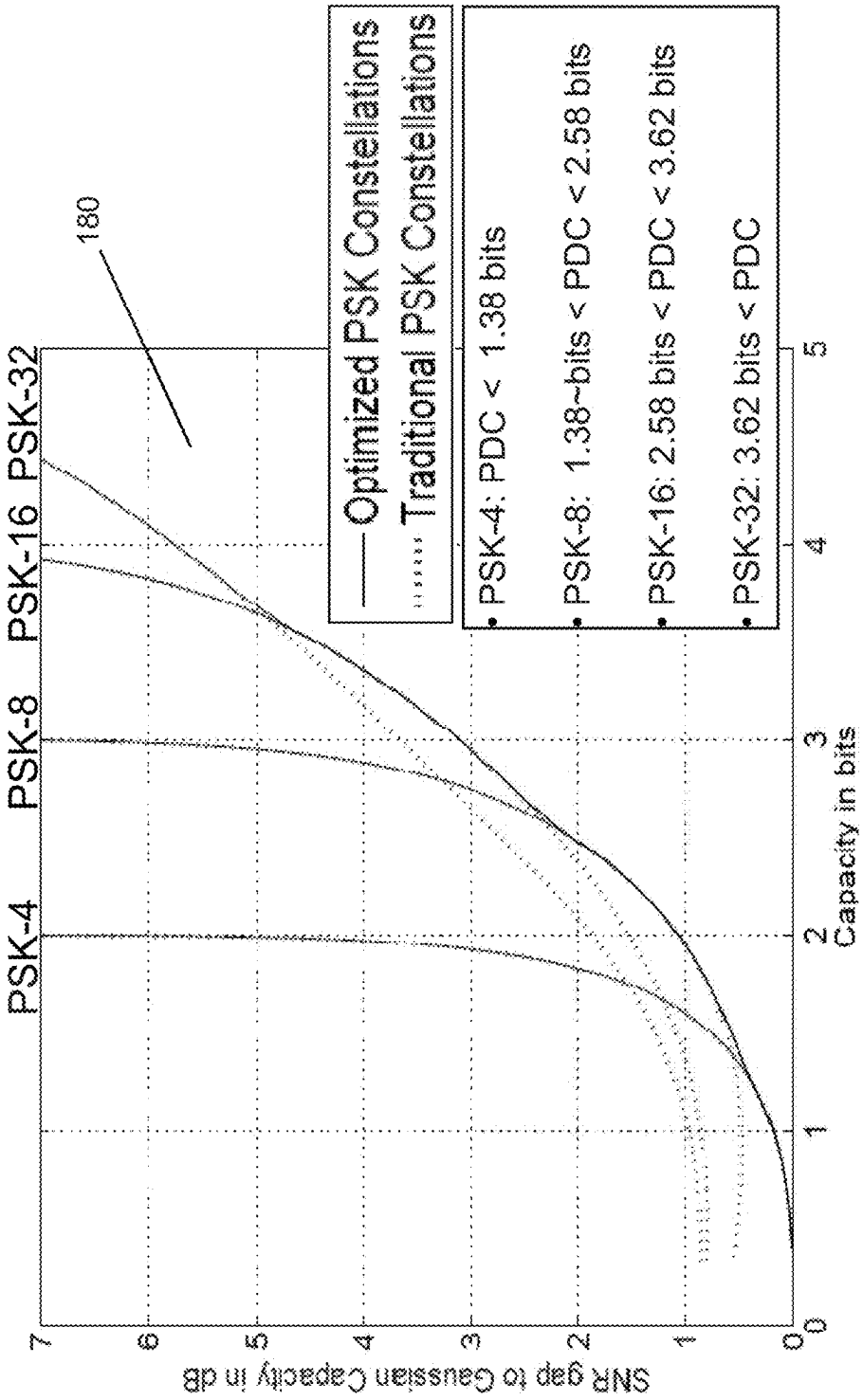

180
PSK-4
PSK-8
PSK-16
PSK-32
Optimized PSK Constellations
Traditional PSK Constellations
PSK-4: PDC < 1.38 bits
PSK-8: 1.38~bits < PDC < 2.58 bits
PSK-16: 2.58 bits < PDC < 3.62 bits
PSK-32: 3.62 bits < PDC
SNR gap to Gaussian Capacity in dB
Capacity in bits
0
1
2
3
4
5
6
7

FIG. 18

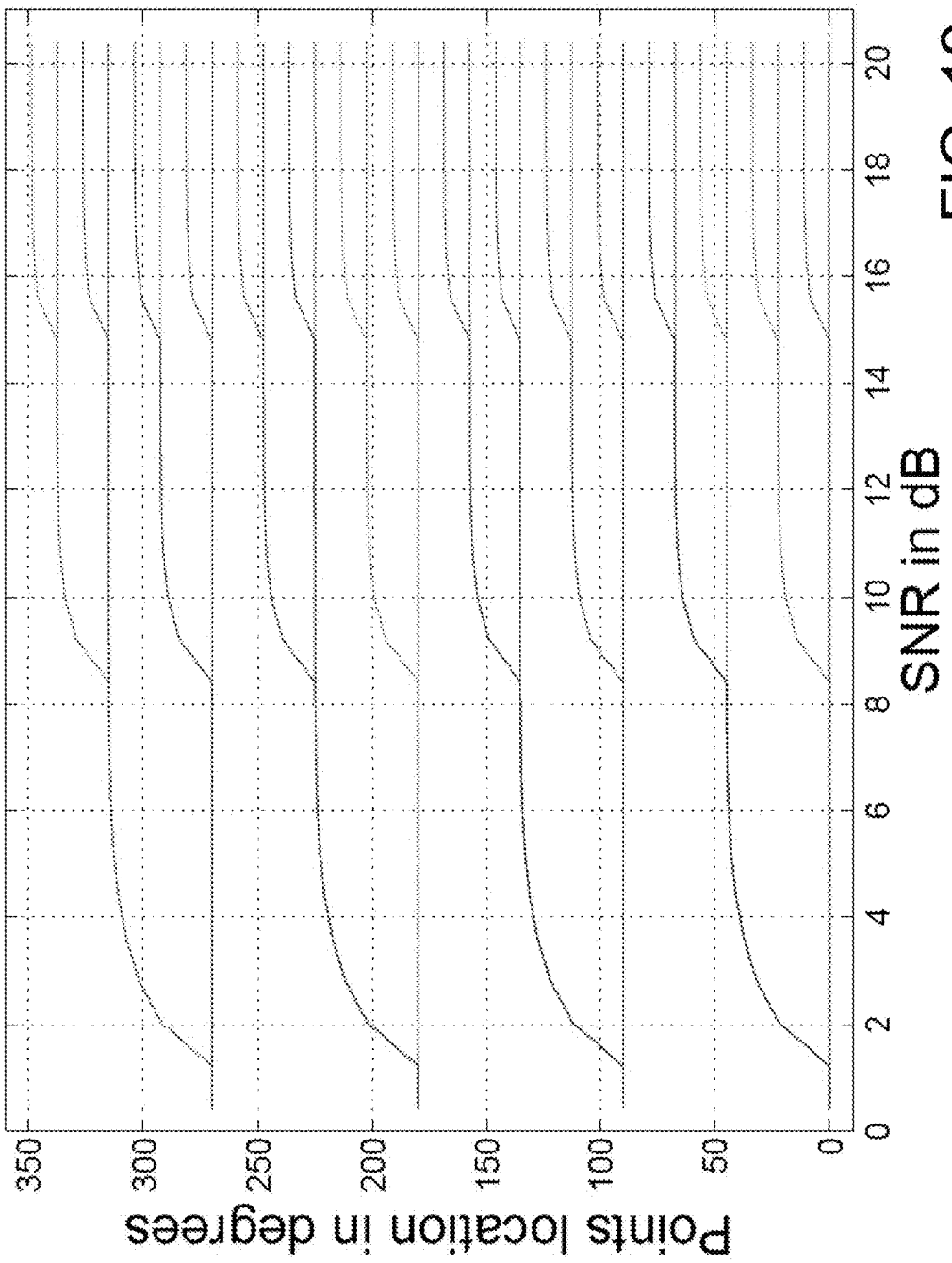

Points location in degrees
350
300
250
200
150
100
50
0
0
2
4
6
8
10
12
14
16
18
20
SNR in dB

FIG. 19

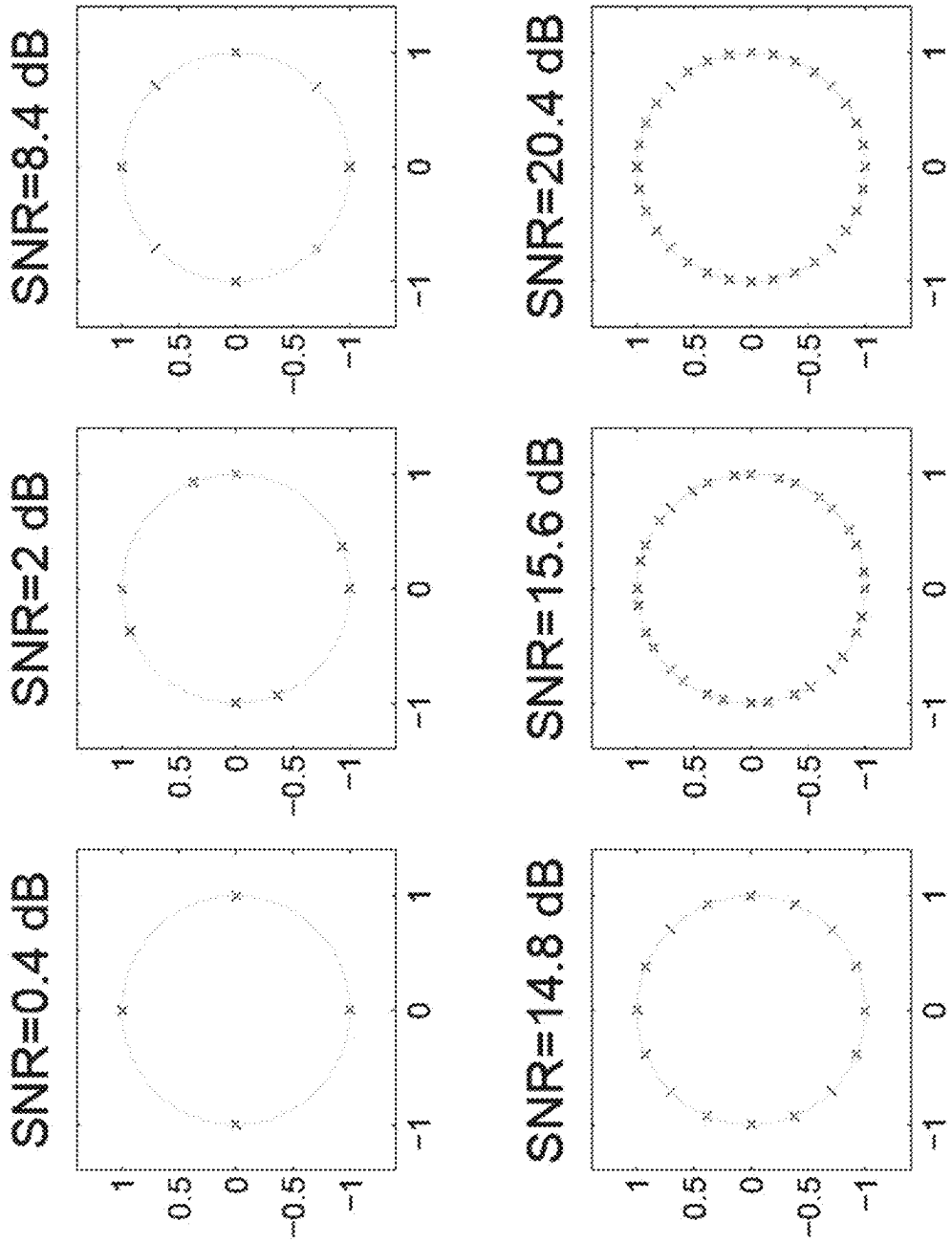

SNR=0.4 dB
SNR=2 dB
SNR=8.4 dB
SNR=14.8 dB
SNR=15.6 dB
SNR=20.4 dB
1
0.5
0
−0.5
−1
−1
0
1

FIG. 20

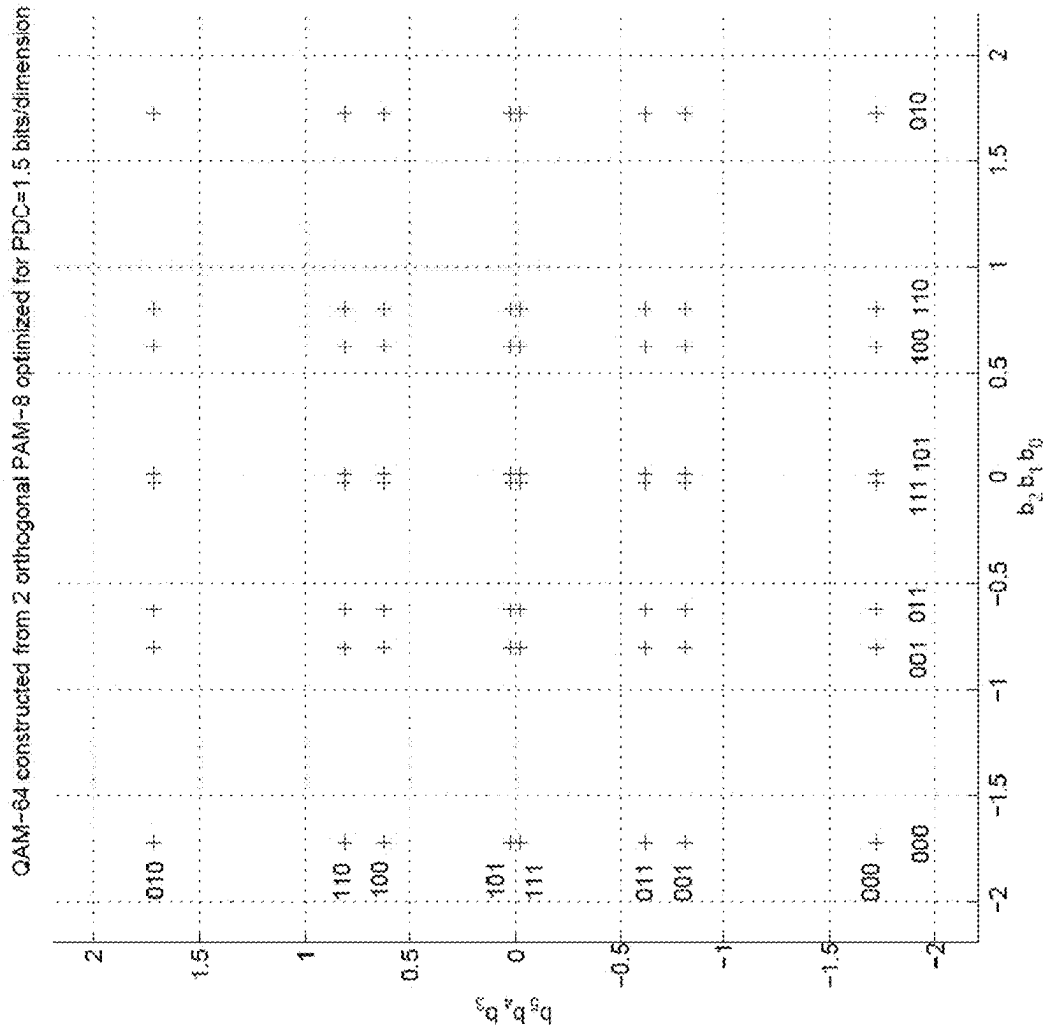

QAM-64 constructed from 2 orthogonal PAM-8 optimized for PDC=1.5 bits/dimension
010
110
100
101
111
011
001
000
000
001
011
111
101
100
110
010
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
$b_2b_1b_0$
$b_2b_1b_0$

FIG. 21

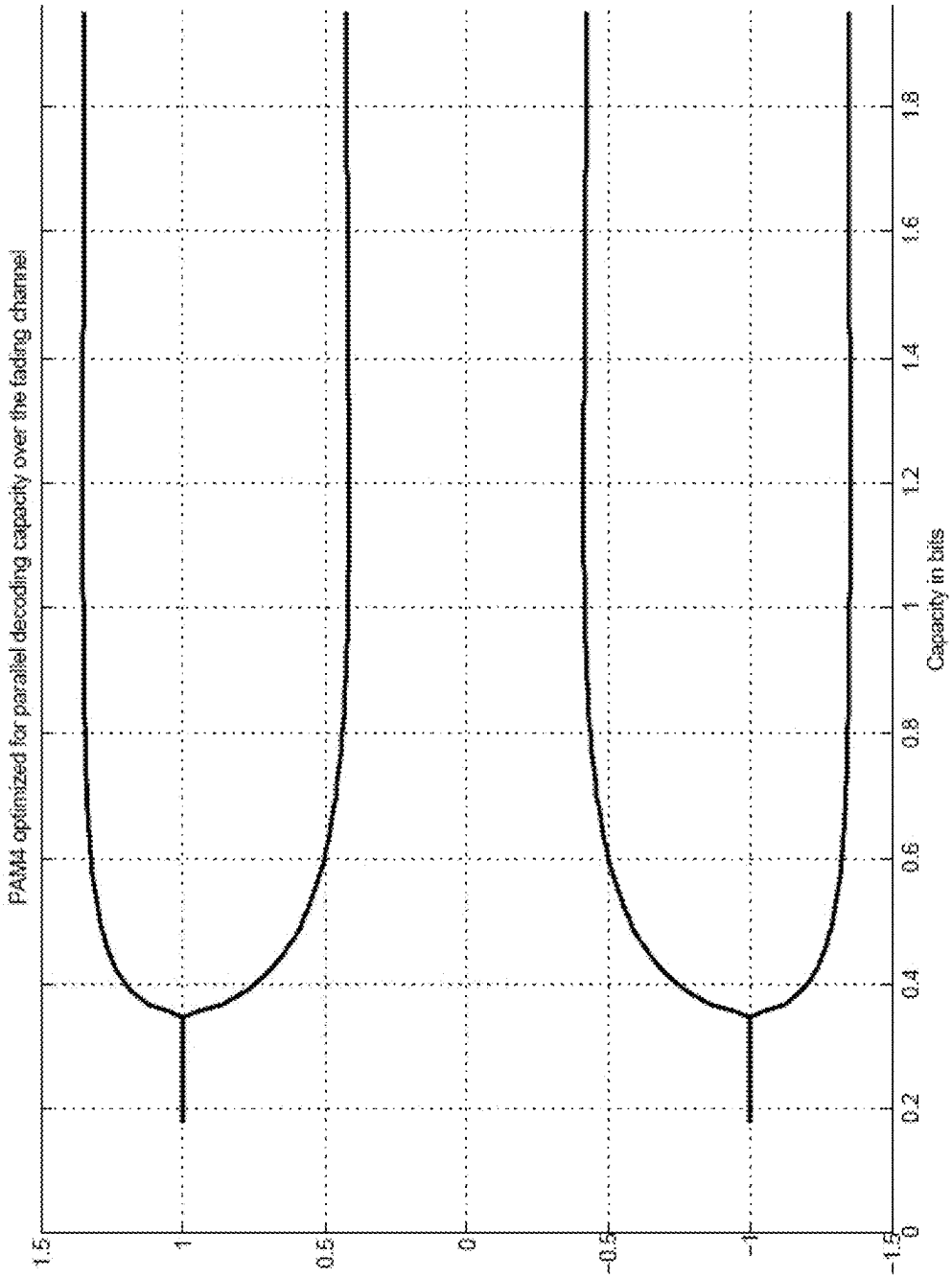

PAM4 optimized for parallel decoding capacity over the fading channel
1.5
1
0.5
0
-0.5
-1
-1.5
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
Capacity in bits

FIG. 22a

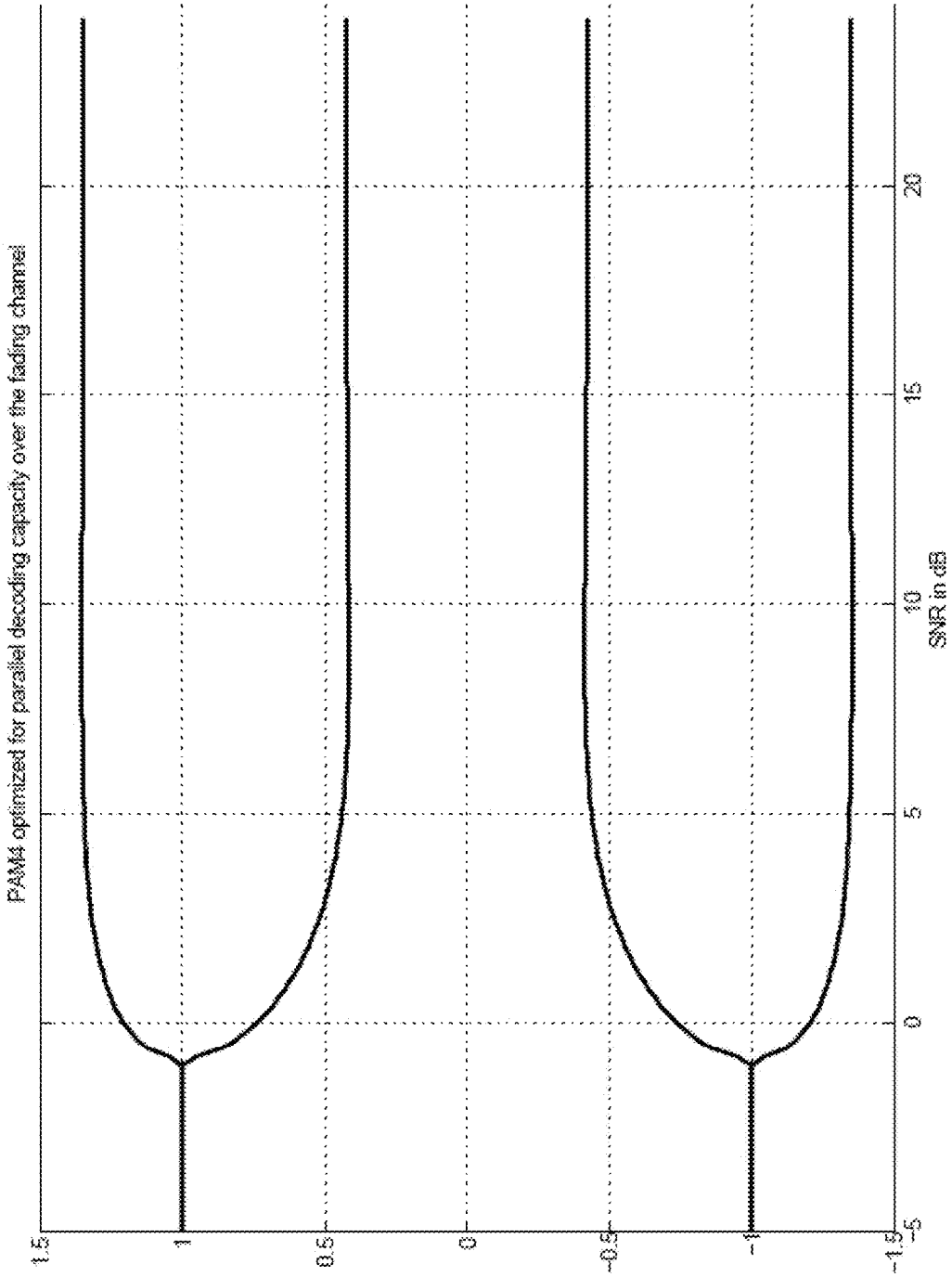

PAM4 optimized for parallel decoding capacity over the fading channel
1.5
1
0.5
0
-0.5
-1
-1.5
-5
0
5
10
15
20
SNR in dB

FIG. 22b

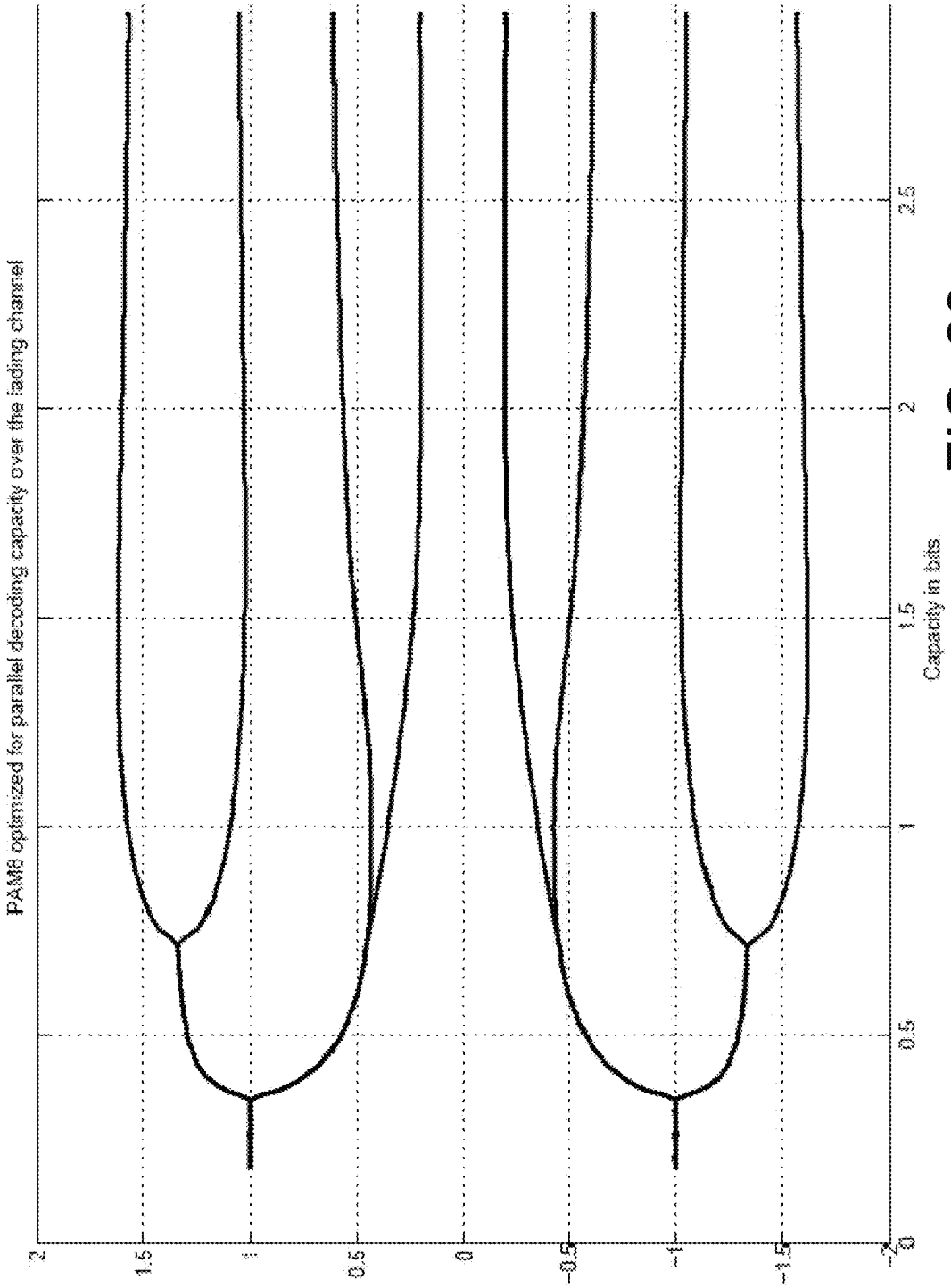

PAM8 optimized for parallel decoding capacity over the fading channel
Capacity in bits
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
0
0.5
1
1.5
2
2.5

FIG. 23a

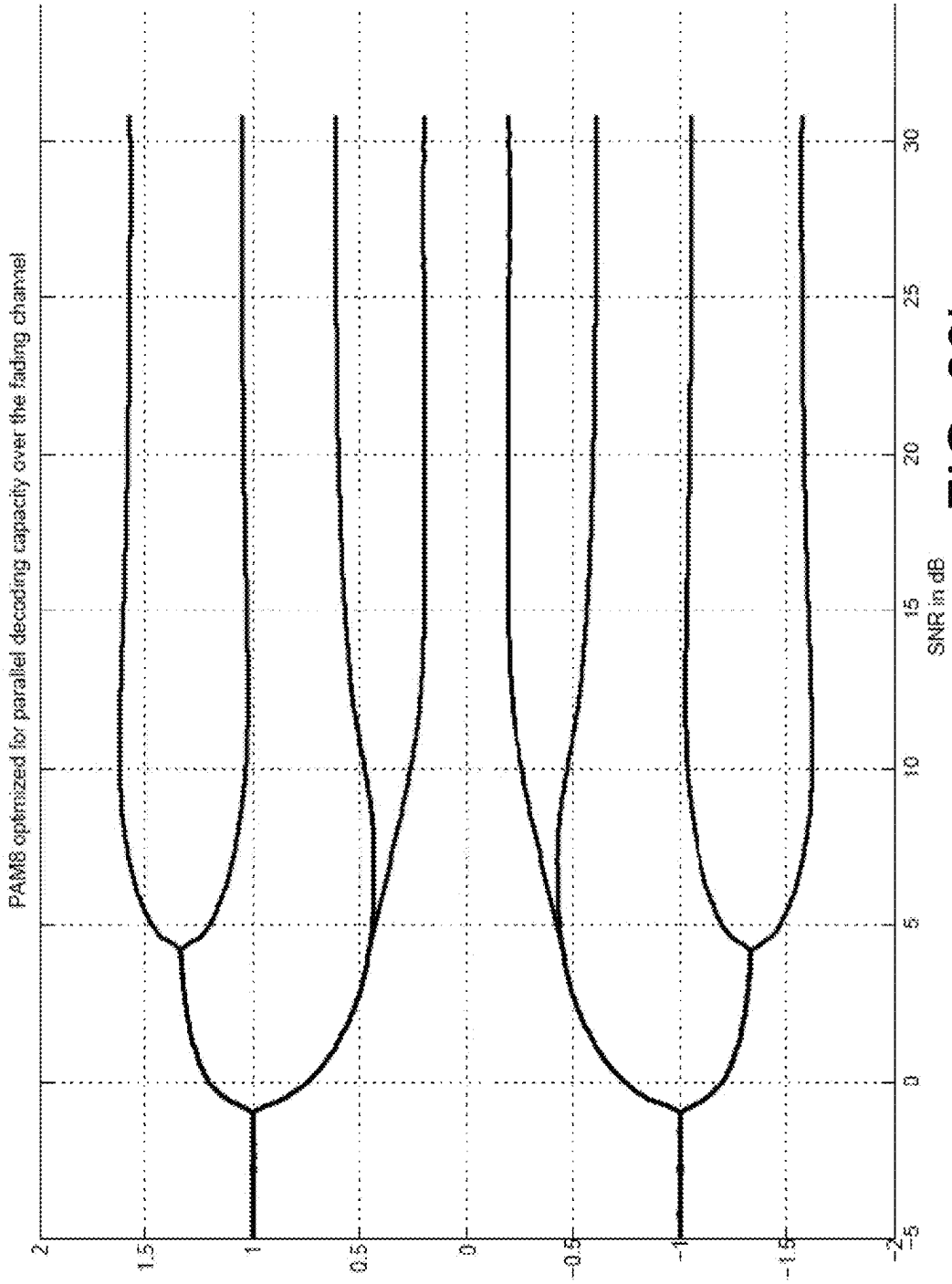

PAM8 optimized for parallel decoding capacity over the fading channel
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
-5
0
5
10
15
20
25
30
SNR in dB

FIG. 23b

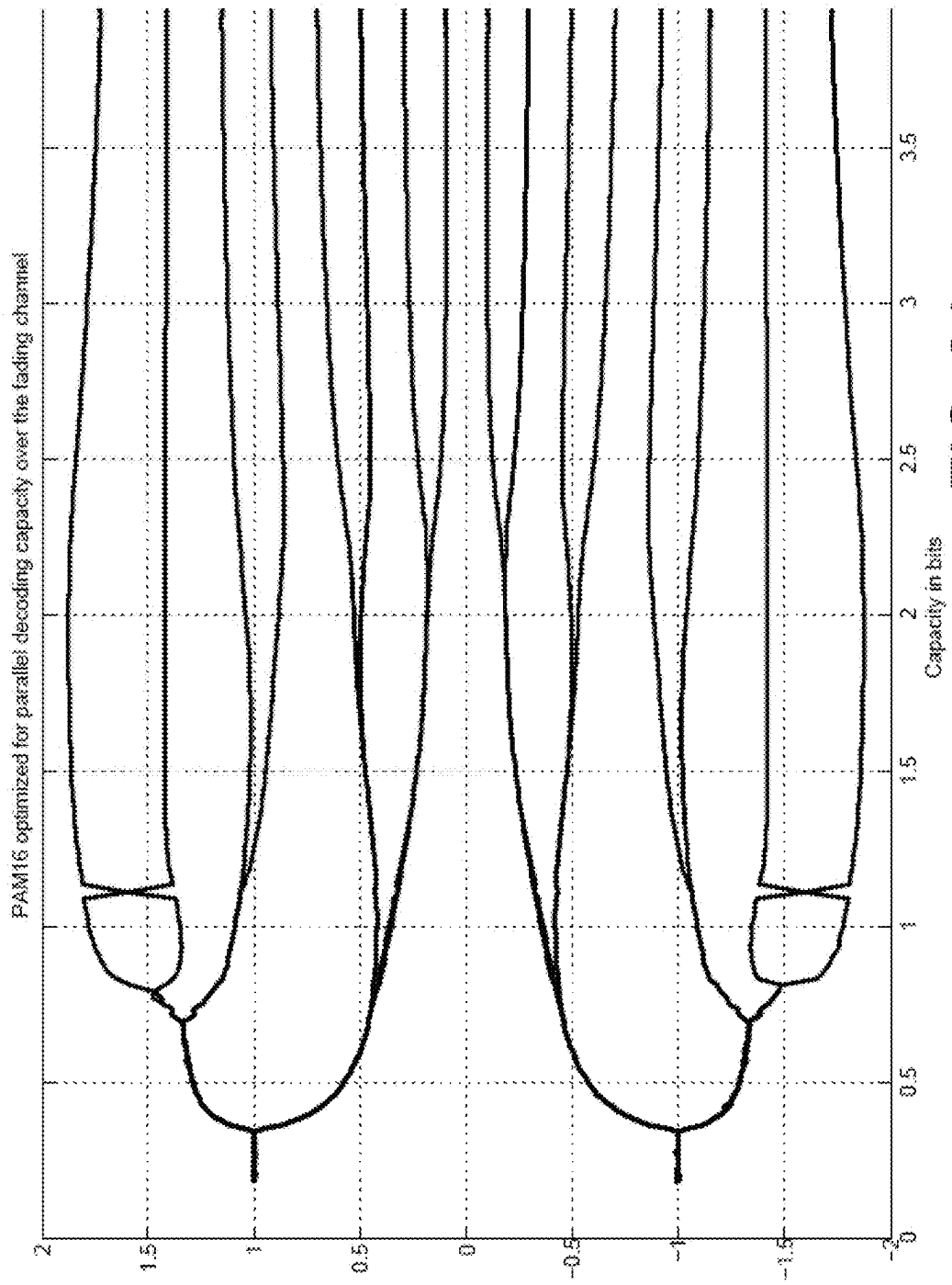

PAM16 optimized for parallel decoding capacity over the fading channel
Capacity in bits
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
0
0.5
1
1.5
2
2.5
3
3.5

FIG. 24a

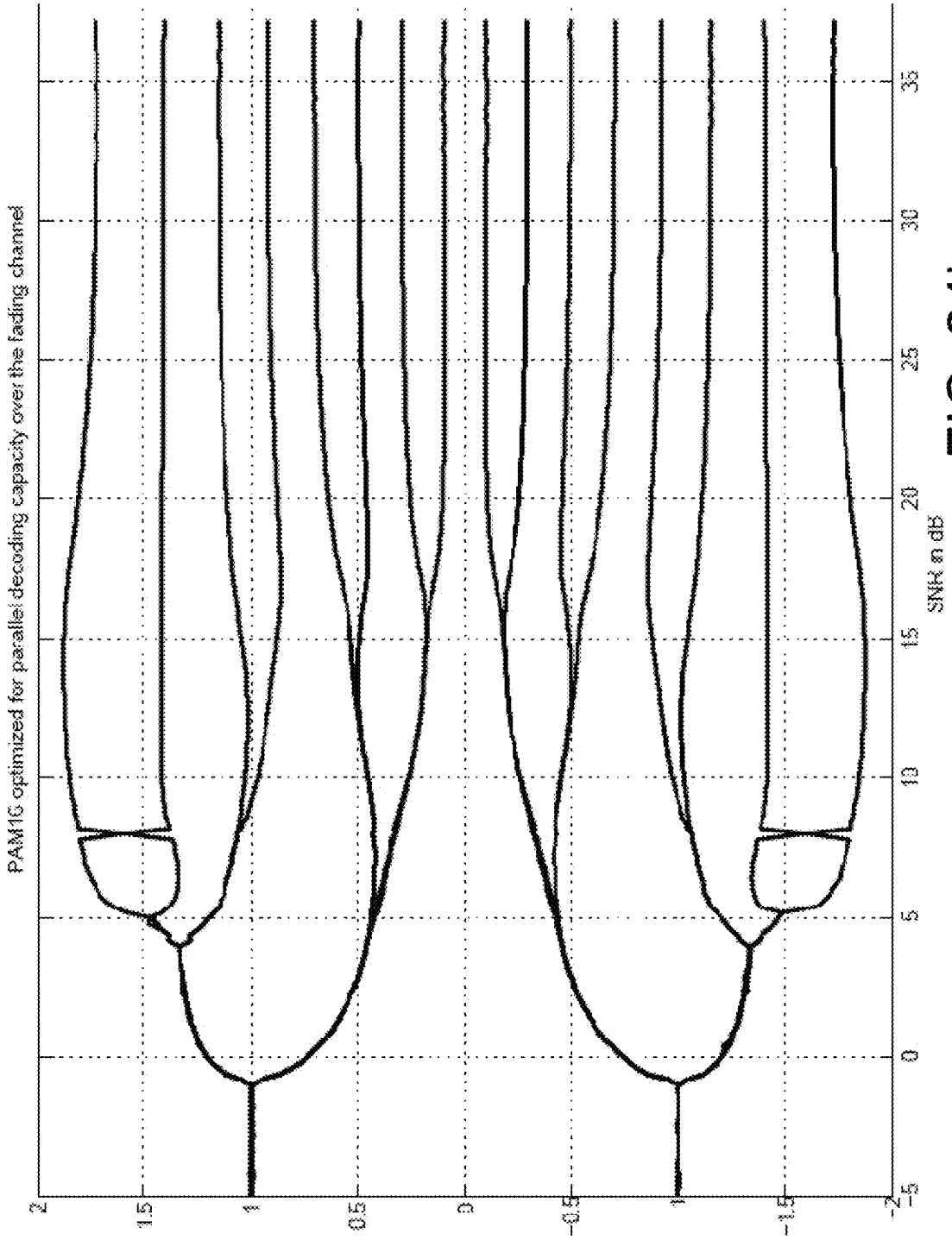

PAM16 optimized for parallel decoding capacity over the fading channel
SNR in dB
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
-5
0
5
10
15
20
25
30
35

FIG. 24b

	SNR	Opt. Cap	Std. Cap	Gain [bits]	Gain %
Design #					
1	-5.0000	0.1982	0.1980	0.0002	0.0833
2	-4.8000	0.2063	0.2061	0.0002	0.0924
3	-4.6000	0.2147	0.2145	0.0002	0.1024
4	-4.4000	0.2234	0.2232	0.0003	0.1133
5	-4.2000	0.2324	0.2321	0.0003	0.1252
6	-4.0000	0.2417	0.2414	0.0003	0.1382
7	-3.8000	0.2513	0.2510	0.0004	0.1523
8	-3.6000	0.2613	0.2608	0.0004	0.1677
9	-3.4000	0.2715	0.2710	0.0005	0.1845
10	-3.2000	0.2821	0.2815	0.0006	0.2026
11	-3.0000	0.2930	0.2924	0.0006	0.2222
12	-2.8000	0.3043	0.3035	0.0007	0.2433
13	-2.6000	0.3159	0.3150	0.0008	0.2662
14	-2.4000	0.3278	0.3269	0.0010	0.2907
15	-2.2000	0.3401	0.3390	0.0011	0.3171
16	-2.0000	0.3528	0.3516	0.0012	0.3453
17	-1.8000	0.3658	0.3644	0.0014	0.3755
18	-1.6000	0.3792	0.3776	0.0015	0.4078
19	-1.4000	0.3929	0.3912	0.0017	0.4422
20	-1.2000	0.4070	0.4051	0.0019	0.4788
21	-1.0000	0.4215	0.4194	0.0022	0.5176
22	-0.8000	0.4364	0.4340	0.0024	0.5587
23	-0.6000	0.4516	0.4489	0.0027	0.6021
24	-0.4000	0.4672	0.4642	0.0030	0.6479
25	-0.2000	0.4832	0.4799	0.0033	0.6961
26	0.0000	0.4996	0.4959	0.0037	0.7468
27	0.0050	0.5000	0.4963	0.0037	0.7481
28	0.2000	0.5163	0.5122	0.0041	0.7999
29	0.4000	0.5334	0.5289	0.0045	0.8554
30	0.6000	0.5509	0.5459	0.0050	0.9133
31	0.8000	0.5688	0.5633	0.0055	0.9736
32	1.0000	0.5870	0.5810	0.0060	1.0363
33	1.2000	0.6056	0.5990	0.0066	1.1012
34	1.4000	0.6245	0.6173	0.0072	1.1684
35	1.6000	0.6439	0.6360	0.0079	1.2377
36	1.8000	0.6635	0.6550	0.0086	1.3090
37	2.0000	0.6835	0.6742	0.0093	1.3822
38	2.2000	0.7039	0.6938	0.0101	1.4572
39	2.4000	0.7246	0.7137	0.0109	1.5338
40	2.6000	0.7457	0.7338	0.0118	1.6117

Table I

FIG. 25

	SNR	Opt. Cap	Std. Cap	Gain [bits]	Gain %
Design #					
41	2.8000	0.7670	0.7543	0.0128	1.6909
42	3.0000	0.7887	0.7750	0.0137	1.7709
43	3.2000	0.8107	0.7960	0.0147	1.8516
44	3.4000	0.8331	0.8173	0.0158	1.9326
45	3.6000	0.8557	0.8388	0.0169	2.0134
46	3.8000	0.8786	0.8606	0.0180	2.0938
47	4.0000	0.9018	0.8826	0.0192	2.1731
48	4.2000	0.9252	0.9049	0.0204	2.2508
49	4.4000	0.9490	0.9274	0.0216	2.3263
50	4.6000	0.9729	0.9501	0.0228	2.3989
51	4.8000	0.9971	0.9731	0.0240	2.4677
52	4.8237	1.0000	0.9758	0.0242	2.4755
53	5.0000	1.0215	0.9963	0.0252	2.5318
54	5.2000	1.0461	1.0197	0.0264	2.5905
55	5.4000	1.0710	1.0433	0.0276	2.6491
56	5.6000	1.0960	1.0672	0.0289	2.7048
57	5.8000	1.1213	1.0912	0.0301	2.7584
58	6.0000	1.1468	1.1154	0.0313	2.8099
59	6.2000	1.1724	1.1398	0.0326	2.8593
60	6.4000	1.1983	1.1644	0.0338	2.9064
61	6.6000	1.2243	1.1892	0.0351	2.9511
62	6.8000	1.2505	1.2142	0.0363	2.9934
63	7.0000	1.2769	1.2393	0.0376	3.0322
64	7.2000	1.3034	1.2646	0.0388	3.0663
65	7.4000	1.3300	1.2901	0.0399	3.0952
66	7.6000	1.3567	1.3157	0.0410	3.1187
67	7.8000	1.3836	1.3415	0.0421	3.1367
68	8.0000	1.4105	1.3674	0.0431	3.1506
69	8.2000	1.4376	1.3935	0.0440	3.1605
70	8.4000	1.4647	1.4197	0.0450	3.1665
71	8.6000	1.4919	1.4461	0.0458	3.1682
72	8.6592	1.5000	1.4539	0.0461	3.1678
73	8.8000	1.5192	1.4726	0.0466	3.1655
74	9.0000	1.5466	1.4992	0.0474	3.1584
75	9.2000	1.5740	1.5260	0.0480	3.1466
76	9.4000	1.6015	1.5529	0.0486	3.1299
77	9.6000	1.6290	1.5799	0.0491	3.1084
78	9.8000	1.6566	1.6070	0.0496	3.0839
79	10.0000	1.6843	1.6343	0.0500	3.0574
80	10.2000	1.7120	1.6616	0.0503	3.0290

Table 2

FIG. 26

	SNR	Opt. Cap	Std. Cap	Gain [bits]	Gain %
Design #					
81	10.4000	1.7398	1.6891	0.0506	2.9986
82	10.6000	1.7676	1.7167	0.0509	2.9662
83	10.8000	1.7955	1.7443	0.0511	2.9317
84	11.0000	1.8234	1.7721	0.0513	2.8951
85	11.2000	1.8514	1.8000	0.0514	2.8562
86	11.4000	1.8794	1.8279	0.0515	2.8149
87	11.6000	1.9074	1.8560	0.0514	2.7710
88	11.8000	1.9354	1.8841	0.0513	2.7244
89	12.0000	1.9634	1.9123	0.0512	2.6750
90	12.2000	1.9915	1.9406	0.0509	2.6226
91	12.2611	2.0000	1.9492	0.0508	2.6059
92	12.4000	2.0195	1.9689	0.0505	2.5670
93	12.6000	2.0474	1.9973	0.0501	2.5084
94	12.8000	2.0754	2.0258	0.0496	2.4466
95	13.0000	2.1033	2.0544	0.0489	2.3816
96	13.2000	2.1311	2.0829	0.0482	2.3135
97	13.4000	2.1589	2.1116	0.0473	2.2424
98	13.6000	2.1867	2.1402	0.0464	2.1683
99	13.8000	2.2143	2.1689	0.0454	2.0915
100	14.0000	2.2419	2.1976	0.0442	2.0121
101	14.2000	2.2693	2.2263	0.0430	1.9306
102	14.4000	2.2967	2.2550	0.0417	1.8471
103	14.6000	2.3239	2.2837	0.0402	1.7622
104	14.8000	2.3510	2.3122	0.0388	1.6762
105	15.0000	2.3779	2.3407	0.0372	1.5896
106	15.2000	2.4047	2.3691	0.0356	1.5030
107	15.4000	2.4313	2.3973	0.0340	1.4168
108	15.6000	2.4576	2.4253	0.0323	1.3317
109	15.8000	2.4837	2.4531	0.0306	1.2481
110	15.9256	2.5000	2.4704	0.0296	1.1965
111	16.0000	2.5096	2.4806	0.0289	1.1664
112	16.2000	2.5351	2.5078	0.0273	1.0871
113	16.4000	2.5603	2.5347	0.0256	1.0105
114	16.6000	2.5851	2.5611	0.0240	0.9369
115	16.8000	2.6095	2.5871	0.0224	0.8664
116	17.0000	2.6334	2.6125	0.0209	0.7992
117	17.2000	2.6568	2.6374	0.0194	0.7354
118	17.4000	2.6796	2.6616	0.0180	0.6750
119	17.6000	2.7017	2.6851	0.0166	0.6179
120	17.8000	2.7233	2.7080	0.0153	0.5642

Table 3

FIG. 27

	SNR	Opt. Cap	Std. Cap	Gain [bits]	Gain %
Design #					
121	18.0000	2.7441	2.7300	0.0140	0.5137
122	18.2000	2.7641	2.7513	0.0128	0.4664
123	18.4000	2.7834	2.7717	0.0117	0.4222
124	18.6000	2.8018	2.7912	0.0106	0.3811
125	18.8000	2.8194	2.8097	0.0096	0.3428
126	19.0000	2.8360	2.8274	0.0087	0.3072
127	19.2000	2.8518	2.8440	0.0078	0.2744
128	19.4000	2.8667	2.8597	0.0070	0.2442
129	19.6000	2.8806	2.8743	0.0062	0.2164
130	19.8000	2.8936	2.8880	0.0055	0.1910
131	20.0000	2.9056	2.9007	0.0049	0.1678
132	20.2000	2.9167	2.9125	0.0043	0.1468
133	20.4000	2.9269	2.9232	0.0037	0.1277
134	20.6000	2.9363	2.9330	0.0032	0.1104
135	20.8000	2.9448	2.9420	0.0028	0.0951
136	21.0000	2.9524	2.9500	0.0024	0.0813
137	21.2000	2.9593	2.9572	0.0020	0.0692
138	21.4000	2.9654	2.9636	0.0017	0.0584
139	21.6000	2.9708	2.9693	0.0015	0.0491
140	21.8000	2.9755	2.9743	0.0012	0.0409
141	22.0000	2.9797	2.9786	0.0010	0.0338
142	22.2000	2.9832	2.9824	0.0008	0.0278
143	22.4000	2.9863	2.9856	0.0007	0.0226
144	22.6000	2.9889	2.9884	0.0005	0.0183
145	22.8000	2.9911	2.9907	0.0004	0.0145
146	23.0000	2.9929	2.9926	0.0003	0.0115
147	23.2000	2.9944	2.9942	0.0003	0.0092
148	23.4000	2.9957	2.9955	0.0002	0.0071

Table 4

FIG. 28

	Label							
	0	1	2	3	4	5	6	7
Design #								
1	-8.450	-2.051	-2.051	-2.048	2.035	2.057	2.057	8.450
2	-8.446	-2.061	-2.059	-2.046	2.055	2.055	2.055	8.446
3	-8.441	-2.064	-2.064	-2.057	2.061	2.061	2.062	8.441
4	-8.436	-2.067	-2.069	-2.068	2.067	2.067	2.069	8.436
5	-8.432	-2.075	-2.076	-2.072	2.074	2.075	2.074	8.432
6	-8.426	-2.082	-2.081	-2.081	2.081	2.081	2.081	8.426
7	-8.421	-2.089	-2.089	-2.089	2.089	2.089	2.089	8.421
8	-8.416	-2.097	-2.097	-2.095	2.096	2.096	2.097	8.416
9	-8.410	-2.104	-2.104	-2.104	2.102	2.105	2.105	8.410
10	-8.404	-2.112	-2.112	-2.112	2.111	2.112	2.112	8.404
11	-8.397	-2.120	-2.120	-2.120	2.120	2.120	2.120	8.397
12	-8.391	-2.129	-2.129	-2.129	2.129	2.129	2.129	8.391
13	-8.384	-2.138	-2.138	-2.138	2.138	2.138	2.138	8.384
14	-8.377	-2.147	-2.147	-2.147	2.147	2.147	2.147	8.377
15	-8.370	-2.156	-2.156	-2.156	2.156	2.156	2.156	8.370
16	-8.362	-2.166	-2.166	-2.166	2.166	2.166	2.166	8.362
17	-8.354	-2.176	-2.176	-2.176	2.176	2.176	2.176	8.354
18	-8.347	-2.186	-2.186	-2.186	2.186	2.186	2.186	8.347
19	-8.338	-2.196	-2.196	-2.196	2.196	2.196	2.196	8.338
20	-8.330	-2.207	-2.207	-2.207	2.207	2.207	2.207	8.330
21	-8.322	-2.218	-2.218	-2.218	2.217	2.218	2.218	8.322
22	-8.313	-2.228	-2.228	-2.228	2.228	2.228	2.228	8.313
23	-8.304	-2.239	-2.239	-2.239	2.239	2.239	2.239	8.304
24	-8.295	-2.250	-2.250	-2.250	2.250	2.250	2.250	8.295
25	-8.286	-2.261	-2.261	-2.261	2.261	2.261	2.261	8.286
26	-8.277	-2.273	-2.273	-2.272	2.273	2.273	2.273	8.277
27	-8.277	-2.273	-2.273	-2.273	2.273	2.273	2.272	8.277
28	-8.268	-2.284	-2.284	-2.284	2.284	2.284	2.284	8.268
29	-8.258	-2.295	-2.295	-2.295	2.295	2.295	2.295	8.258
30	-8.249	-2.306	-2.306	-2.306	2.306	2.306	2.306	8.249
31	-8.240	-2.317	-2.317	-2.317	2.317	2.317	2.317	8.240
32	-8.230	-2.328	-2.328	-2.328	2.328	2.328	2.328	8.230
33	-8.221	-2.339	-2.339	-2.339	2.339	2.339	2.339	8.221
34	-8.212	-2.350	-2.350	-2.350	2.350	2.350	2.350	8.212
35	-8.202	-2.361	-2.361	-2.361	2.361	2.361	2.361	8.202
36	-8.193	-2.372	-2.372	-2.372	2.372	2.372	2.372	8.193
37	-8.184	-2.382	-2.382	-2.382	2.382	2.382	2.382	8.184
38	-8.175	-2.392	-2.392	-2.392	2.392	2.392	2.392	8.175
39	-8.166	-2.402	-2.402	-2.402	2.402	2.402	2.402	8.166
40	-8.157	-2.412	-2.412	-2.412	2.412	2.412	2.412	8.157

Table 5

FIG. 29

	Label							
	0	1	2	3	4	5	6	7
Design #								
41	-8.149	-2.422	-2.422	-2.422	2.422	2.422	2.422	8.149
42	-8.141	-2.431	-2.431	-2.431	2.431	2.431	2.431	8.141
43	-8.132	-2.440	-2.440	-2.440	2.440	2.440	2.440	8.132
44	-8.124	-2.449	-2.449	-2.449	2.449	2.449	2.449	8.124
45	-8.117	-2.458	-2.458	-2.458	2.458	2.458	2.458	8.117
46	-8.109	-2.466	-2.466	-2.466	2.466	2.466	2.466	8.109
47	-8.102	-2.474	-2.474	-2.474	2.474	2.474	2.474	8.102
48	-8.095	-2.481	-2.481	-2.481	2.481	2.481	2.481	8.095
49	-8.088	-2.489	-2.489	-2.489	2.489	2.489	2.489	8.088
50	-8.082	-2.496	-2.496	-2.496	2.496	2.496	2.496	8.082
51	-8.075	-2.503	-2.503	-2.503	2.503	2.503	2.503	8.075
52	-8.075	-2.503	-2.503	-2.503	2.503	2.503	2.503	8.075
53	-8.069	-2.509	-2.509	-2.509	2.509	2.509	2.509	8.069
54	-8.063	-2.513	-2.513	-2.513	2.391	2.391	2.761	8.061
55	-8.031	-2.900	-2.900	-1.639	1.639	2.900	2.900	8.031
56	-8.012	-2.987	-2.987	-1.403	1.403	2.987	2.987	8.012
57	-7.993	-3.055	-3.055	-1.199	1.199	3.055	3.055	7.993
58	-7.976	-3.111	-3.111	-1.012	1.012	3.111	3.111	7.976
59	-7.960	-3.158	-3.158	-0.832	0.832	3.158	3.158	7.960
60	-7.945	-3.199	-3.199	-0.649	0.649	3.199	3.199	7.945
61	-7.930	-3.234	-3.234	-0.445	0.445	3.234	3.234	7.930
62	-7.916	-3.265	-3.265	-0.123	0.123	3.265	3.265	7.916
63	-7.906	-3.279	-3.279	0.000	0.000	3.279	3.279	7.906
64	-7.896	-3.291	-3.291	0.000	0.000	3.291	3.291	7.896
65	-7.885	-3.303	-3.303	0.000	0.000	3.303	3.303	7.885
66	-7.875	-3.316	-3.316	0.000	0.000	3.316	3.316	7.875
67	-7.862	-3.486	-3.168	0.000	0.000	3.168	3.486	7.862
68	-7.847	-3.621	-3.052	0.000	0.000	3.052	3.621	7.847
69	-7.833	-3.711	-2.979	0.000	0.000	2.979	3.711	7.833
70	-7.819	-3.782	-2.925	0.000	0.000	2.925	3.782	7.819
71	-7.806	-3.843	-2.881	0.000	0.000	2.881	3.843	7.806
72	-7.802	-3.860	-2.870	0.000	0.000	2.870	3.860	7.802
73	-7.793	-3.897	-2.844	0.000	0.000	2.844	3.897	7.793
74	-7.780	-3.945	-2.812	0.000	0.000	2.812	3.945	7.780
75	-7.768	-3.990	-2.783	0.000	0.000	2.783	3.990	7.768
76	-7.756	-4.031	-2.756	0.000	0.000	2.756	4.031	7.756
77	-7.744	-4.075	-2.720	-0.164	0.164	2.720	4.075	7.744
78	-7.730	-4.131	-2.656	-0.362	0.362	2.656	4.131	7.730
79	-7.717	-4.178	-2.603	-0.471	0.471	2.603	4.178	7.717
80	-7.704	-4.219	-2.560	-0.549	0.549	2.560	4.219	7.704

Table 6

FIG. 30

	Label							
	0	1	2	3	4	5	6	7
Design #								
81	-7.692	-4.255	-2.524	-0.608	0.608	2.524	4.255	7.692
82	-7.680	-4.286	-2.494	-0.654	0.654	2.494	4.286	7.680
83	-7.669	-4.314	-2.471	-0.690	0.690	2.471	4.314	7.669
84	-7.657	-4.340	-2.452	-0.718	0.718	2.452	4.340	7.657
85	-7.647	-4.363	-2.438	-0.740	0.740	2.438	4.363	7.647
86	-7.636	-4.385	-2.428	-0.757	0.757	2.428	4.385	7.636
87	-7.625	-4.405	-2.422	-0.770	0.770	2.422	4.405	7.625
88	-7.614	-4.424	-2.418	-0.780	0.780	2.418	4.424	7.614
89	-7.603	-4.441	-2.417	-0.787	0.787	2.417	4.441	7.603
90	-7.592	-4.458	-2.419	-0.792	0.792	2.419	4.458	7.592
91	-7.589	-4.464	-2.420	-0.793	0.793	2.420	4.464	7.589
92	-7.581	-4.475	-2.423	-0.795	0.795	2.423	4.475	7.581
93	-7.570	-4.491	-2.428	-0.797	0.797	2.428	4.491	7.570
94	-7.558	-4.507	-2.435	-0.799	0.799	2.435	4.507	7.558
95	-7.546	-4.522	-2.444	-0.800	0.800	2.444	4.522	7.546
96	-7.533	-4.538	-2.453	-0.800	0.800	2.453	4.538	7.533
97	-7.521	-4.553	-2.464	-0.801	0.801	2.464	4.553	7.521
98	-7.508	-4.568	-2.475	-0.802	0.802	2.475	4.568	7.508
99	-7.494	-4.583	-2.488	-0.804	0.804	2.488	4.583	7.494
100	-7.481	-4.597	-2.501	-0.805	0.805	2.501	4.597	7.481
101	-7.467	-4.612	-2.514	-0.808	0.808	2.514	4.612	7.467
102	-7.453	-4.626	-2.529	-0.811	0.811	2.529	4.626	7.453
103	-7.439	-4.641	-2.543	-0.815	0.815	2.543	4.641	7.439
104	-7.424	-4.655	-2.559	-0.819	0.819	2.559	4.655	7.424
105	-7.409	-4.669	-2.574	-0.824	0.824	2.574	4.669	7.409
106	-7.395	-4.682	-2.590	-0.830	0.830	2.590	4.682	7.395
107	-7.380	-4.695	-2.607	-0.836	0.836	2.607	4.695	7.380
108	-7.365	-4.708	-2.623	-0.842	0.842	2.623	4.708	7.365
109	-7.350	-4.721	-2.640	-0.849	0.849	2.640	4.721	7.350
110	-7.340	-4.729	-2.651	-0.853	0.853	2.651	4.729	7.340
111	-7.336	-4.733	-2.656	-0.855	0.855	2.656	4.733	7.336
112	-7.322	-4.745	-2.672	-0.862	0.862	2.672	4.745	7.322
113	-7.308	-4.756	-2.687	-0.869	0.869	2.687	4.756	7.308
114	-7.294	-4.767	-2.703	-0.875	0.875	2.703	4.767	7.294
115	-7.281	-4.778	-2.717	-0.882	0.882	2.717	4.778	7.281
116	-7.269	-4.788	-2.731	-0.888	0.888	2.731	4.788	7.269
117	-7.256	-4.798	-2.744	-0.893	0.893	2.744	4.798	7.256
118	-7.245	-4.807	-2.757	-0.899	0.899	2.757	4.807	7.245
119	-7.233	-4.816	-2.769	-0.904	0.904	2.769	4.816	7.233
120	-7.223	-4.824	-2.781	-0.909	0.909	2.781	4.824	7.223

Table 7

FIG. 31

	Label							
	0	1	2	3	4	5	6	7
Design #								
121	-7.213	-4.832	-2.792	-0.914	0.914	2.792	4.832	7.213
122	-7.203	-4.840	-2.802	-0.918	0.918	2.802	4.840	7.203
123	-7.194	-4.847	-2.812	-0.922	0.922	2.812	4.847	7.194
124	-7.185	-4.854	-2.821	-0.926	0.926	2.821	4.854	7.185
125	-7.176	-4.861	-2.830	-0.930	0.930	2.830	4.861	7.176
126	-7.168	-4.867	-2.838	-0.933	0.933	2.838	4.867	7.168
127	-7.161	-4.873	-2.846	-0.937	0.937	2.846	4.873	7.161
128	-7.154	-4.879	-2.853	-0.940	0.940	2.853	4.879	7.154
129	-7.147	-4.885	-2.860	-0.943	0.943	2.860	4.885	7.147
130	-7.140	-4.890	-2.867	-0.945	0.945	2.867	4.890	7.140
131	-7.134	-4.895	-2.873	-0.948	0.948	2.873	4.895	7.134
132	-7.128	-4.900	-2.879	-0.950	0.950	2.879	4.900	7.128
133	-7.122	-4.904	-2.885	-0.953	0.953	2.885	4.904	7.122
134	-7.116	-4.909	-2.890	-0.955	0.955	2.890	4.909	7.116
135	-7.111	-4.913	-2.895	-0.957	0.957	2.895	4.913	7.111
136	-7.106	-4.917	-2.900	-0.959	0.959	2.900	4.917	7.106
137	-7.102	-4.920	-2.904	-0.961	0.961	2.904	4.920	7.102
138	-7.097	-4.924	-2.909	-0.963	0.963	2.909	4.924	7.097
139	-7.093	-4.927	-2.913	-0.965	0.965	2.913	4.927	7.093
140	-7.089	-4.931	-2.917	-0.966	0.966	2.917	4.931	7.089
141	-7.084	-4.934	-2.921	-0.968	0.968	2.921	4.934	7.084
142	-7.081	-4.937	-2.924	-0.969	0.969	2.924	4.937	7.081
143	-7.077	-4.940	-2.928	-0.971	0.971	2.928	4.940	7.077
144	-7.074	-4.942	-2.931	-0.972	0.972	2.931	4.942	7.074
145	-7.071	-4.945	-2.934	-0.973	0.973	2.934	4.945	7.071
146	-7.068	-4.947	-2.937	-0.974	0.974	2.937	4.947	7.068
147	-7.064	-4.950	-2.941	-0.976	0.976	2.941	4.950	7.064
148	-7.062	-4.952	-2.942	-0.977	0.977	2.942	4.952	7.062

Table 8

FIG. 32

Design #	SNRs	5.00%	15.00%	30.00%	45.00%	60.00%	100.00%
1	-5	0.12	0.11	0.1	0.09	0.06	0
2	-4.8	0.12	0.11	0.1	0.09	0.06	0
3	-4.6	0.13	0.12	0.11	0.09	0.08	0
4	-4.4	0.13	0.12	0.1	0.09	0.07	0
5	-4.2	0.14	0.13	0.11	0.1	0.07	0
6	-4	0.15	0.14	0.12	0.11	0.08	0
7	-3.8	0.15	0.14	0.12	0.11	0.08	0
8	-3.6	0.17	0.15	0.14	0.12	0.09	0
9	-3.4	0.18	0.16	0.15	0.13	0.09	0
10	-3.2	0.18	0.16	0.15	0.13	0.1	0
11	-3	0.2	0.18	0.16	0.14	0.1	0
12	-2.8	0.19	0.17	0.16	0.14	0.1	0
13	-2.6	0.21	0.19	0.17	0.15	0.11	0
14	-2.4	0.23	0.21	0.19	0.17	0.12	0
15	-2.2	0.23	0.2	0.18	0.17	0.12	0
16	-2	0.25	0.22	0.2	0.18	0.13	0
17	-1.8	0.27	0.24	0.22	0.2	0.13	0
18	-1.6	0.26	0.24	0.21	0.19	0.14	0
19	-1.4	0.29	0.26	0.23	0.21	0.15	0
20	-1.2	0.28	0.25	0.23	0.2	0.15	0
21	-1	0.3	0.27	0.25	0.22	0.16	0
22	-0.8	0.33	0.3	0.27	0.24	0.18	0
23	-0.6	0.32	0.29	0.26	0.23	0.17	0
24	-0.4	0.35	0.31	0.28	0.25	0.18	0
25	-0.2	0.34	0.3	0.27	0.25	0.2	0
26	0	0.33	0.3	0.27	0.24	0.19	0
27	0.01	0.33	0.3	0.27	0.24	0.19	0
28	0.2	0.32	0.29	0.26	0.23	0.21	0
29	0.4	0.31	0.28	0.25	0.23	0.2	0
30	0.6	0.3	0.27	0.24	0.22	0.2	0
31	0.8	0.29	0.26	0.23	0.21	0.19	0
32	1	0.28	0.25	0.23	0.2	0.18	0
33	1.2	0.27	0.24	0.22	0.2	0.18	0
34	1.4	0.26	0.24	0.21	0.19	0.17	0
35	1.6	0.25	0.23	0.2	0.18	0.17	0
36	1.8	0.24	0.22	0.2	0.18	0.16	0
37	2	0.23	0.21	0.19	0.17	0.15	0
38	2.2	0.22	0.2	0.18	0.16	0.15	0
39	2.4	0.22	0.19	0.17	0.16	0.14	0
40	2.6	0.21	0.19	0.17	0.15	0.14	0

Table 9

FIG. 33

Design #	SNRs	5.00%	15.00%	30.00%	45.00%	60.00%	100.00%
41	2.8	0.2	0.18	0.16	0.14	0.13	0
42	3	0.19	0.17	0.15	0.14	0.13	0
43	3.2	0.18	0.16	0.15	0.13	0.12	0
44	3.4	0.17	0.16	0.14	0.13	0.11	0
45	3.6	0.17	0.15	0.14	0.12	0.11	0
46	3.8	0.16	0.14	0.13	0.12	0.11	0
47	4	0.15	0.14	0.12	0.11	0.1	0
48	4.2	0.15	0.13	0.12	0.11	0.1	0
49	4.4	0.14	0.13	0.11	0.1	0.09	0
50	4.6	0.13	0.12	0.11	0.1	0.09	0
51	4.8	0.13	0.11	0.1	0.09	0.08	0
52	4.82	0.13	0.11	0.1	0.09	0.08	0
53	5	0.12	0.11	0.1	0.09	0.08	0
54	5.2	0.2	0.18	0.16	0.15	0.13	0
55	5.4	0.57	0.51	0.46	0.41	0.27	0
56	5.6	0.56	0.51	0.45	0.41	0.3	0
57	5.8	0.53	0.47	0.43	0.38	0.28	0
58	6	0.56	0.51	0.46	0.41	0.3	0
59	6.2	0.54	0.49	0.44	0.39	0.29	0
60	6.4	0.55	0.49	0.44	0.4	0.29	0
61	6.6	0.55	0.43	0.39	0.35	0.31	0
62	6.8	0.56	0.34	0.31	0.28	0.25	0
63	7	0.56	0.3	0.27	0.25	0.22	0
64	7.2	0.56	0.3	0.27	0.24	0.22	0
65	7.4	0.56	0.29	0.26	0.23	0.21	0
66	7.6	0.57	0.28	0.25	0.23	0.2	0
67	7.8	0.53	0.27	0.24	0.22	0.2	0
68	8	0.54	0.26	0.24	0.21	0.19	0
69	8.2	0.53	0.26	0.23	0.21	0.19	0
70	8.4	0.53	0.25	0.23	0.2	0.18	0
71	8.6	0.53	0.24	0.22	0.2	0.18	0
72	8.66	0.53	0.24	0.22	0.2	0.18	0
73	8.8	0.48	0.24	0.21	0.19	0.17	0
74	9	0.47	0.23	0.21	0.19	0.17	0
75	9.2	0.47	0.22	0.2	0.18	0.16	0
76	9.4	0.47	0.22	0.2	0.18	0.16	0
77	9.6	0.46	0.25	0.23	0.2	0.18	0
78	9.8	0.35	0.29	0.26	0.24	0.21	0
79	10	0.26	0.23	0.21	0.19	0.17	0
80	10.2	0.2	0.18	0.16	0.14	0.13	0

Table 10

FIG. 34

Design #	SNRs	5.00%	15.00%	30.00%	45.00%	60.00%	100.00%
81	10.4	0.15	0.13	0.12	0.11	0.1	0
82	10.6	0.11	0.1	0.09	0.08	0.07	0
83	10.8	0.08	0.07	0.06	0.06	0.05	0
84	11	0.05	0.05	0.04	0.04	0.04	0
85	11.2	0.04	0.03	0.03	0.03	0.02	0
86	11.4	0.02	0.02	0.02	0.02	0.01	0
87	11.6	0.01	0.01	0.01	0.01	0.01	0
88	11.8	0.01	0.01	0	0	0	0
89	12	0.03	0.02	0.01	0.01	0.01	0
90	12.2	0.04	0.03	0.02	0.02	0.02	0
91	12.26	0.04	0.04	0.03	0.02	0.02	0
92	12.4	0.05	0.05	0.03	0.03	0.02	0
93	12.6	0.06	0.06	0.04	0.03	0.03	0
94	12.8	0.08	0.07	0.05	0.04	0.04	0
95	13	0.09	0.08	0.05	0.05	0.04	0
96	13.2	0.1	0.09	0.06	0.05	0.05	0
97	13.4	0.12	0.1	0.07	0.06	0.06	0
98	13.6	0.13	0.12	0.08	0.07	0.07	0
99	13.8	0.14	0.13	0.09	0.08	0.08	0
100	14	0.15	0.14	0.1	0.09	0.08	0
101	14.2	0.17	0.15	0.11	0.1	0.09	0
102	14.4	0.18	0.16	0.13	0.11	0.1	0
103	14.6	0.19	0.17	0.14	0.13	0.11	0
104	14.8	0.21	0.19	0.15	0.14	0.11	0
105	15	0.2	0.18	0.16	0.14	0.1	0
106	15.2	0.21	0.19	0.17	0.14	0.1	0
107	15.4	0.18	0.16	0.14	0.13	0.09	0
108	15.6	0.17	0.15	0.14	0.12	0.09	0
109	15.8	0.16	0.14	0.13	0.12	0.08	0
110	15.93	0.16	0.15	0.13	0.12	0.09	0
111	16	0.15	0.13	0.12	0.11	0.08	0
112	16.2	0.14	0.13	0.11	0.1	0.07	0
113	16.4	0.13	0.12	0.11	0.1	0.07	0
114	16.6	0.13	0.11	0.1	0.09	0.07	0
115	16.8	0.12	0.11	0.1	0.09	0.06	0
116	17	0.12	0.1	0.09	0.08	0.06	0
117	17.2	0.11	0.1	0.09	0.08	0.06	0
118	17.4	0.1	0.09	0.08	0.08	0.06	0
119	17.6	0.1	0.09	0.08	0.07	0.05	0
120	17.8	0.09	0.09	0.08	0.07	0.05	0

Table 11

FIG. 35

Design #	SNRs	5.00%	15.00%	30.00%	45.00%	60.00%	100.00%
121	18	0.09	0.08	0.07	0.07	0.05	0
122	18.2	0.09	0.08	0.07	0.06	0.05	0
123	18.4	0.08	0.07	0.07	0.06	0.04	0
124	18.6	0.08	0.07	0.06	0.06	0.04	0
125	18.8	0.07	0.07	0.06	0.05	0.04	0
126	19	0.07	0.06	0.06	0.05	0.04	0
127	19.2	0.07	0.06	0.05	0.05	0.04	0
128	19.4	0.06	0.06	0.05	0.05	0.03	0
129	19.6	0.06	0.06	0.05	0.04	0.03	0
130	19.8	0.06	0.05	0.05	0.04	0.03	0
131	20	0.06	0.05	0.05	0.04	0.03	0
132	20.2	0.05	0.05	0.04	0.04	0.03	0
133	20.4	0.05	0.05	0.04	0.04	0.02	0
134	20.6	0.05	0.04	0.04	0.04	0.02	0
135	20.8	0.04	0.04	0.03	0.03	0.02	0
136	21	0.04	0.04	0.04	0.03	0.02	0
137	21.2	0.04	0.04	0.03	0.03	0.02	0
138	21.4	0.04	0.03	0.03	0.03	0.02	0
139	21.6	0.03	0.03	0.03	0.03	0.02	0
140	21.8	0.03	0.03	0.03	0.02	0.02	0
141	22	0.03	0.03	0.03	0.02	0.02	0
142	22.2	0.03	0.03	0.02	0.02	0.02	0
143	22.4	0.03	0.03	0.02	0.02	0.02	0
144	22.6	0.03	0.02	0.02	0.02	0.01	0
145	22.8	0.03	0.02	0.02	0.02	0.01	0
146	23	0.02	0.02	0.02	0.02	0.01	0
147	23.2	0.02	0.02	0.02	0.02	0.01	0
148	23.4	0.02	0.02	0.02	0.02	0.01	0

Table 12

FIG. 36

	SNR	Opt. Cap	Std. Cap	Gain [bits]	Gain %
Design #					
1	-5.0000	0.1977	0.1598	0.0379	23.7349
2	-4.8000	0.2058	0.1666	0.0391	23.4911
3	-4.6000	0.2141	0.1737	0.0404	23.2414
4	-4.4000	0.2227	0.1811	0.0416	22.9855
5	-4.2000	0.2316	0.1887	0.0429	22.7233
6	-4.0000	0.2407	0.1966	0.0441	22.4546
7	-3.8000	0.2502	0.2048	0.0454	22.1792
8	-3.6000	0.2600	0.2133	0.0467	21.8969
9	-3.4000	0.2700	0.2220	0.0480	21.6075
10	-3.2000	0.2804	0.2311	0.0493	21.3107
11	-3.0000	0.2910	0.2405	0.0505	21.0063
12	-2.8000	0.3020	0.2502	0.0518	20.6939
13	-2.6000	0.3133	0.2602	0.0530	20.3732
14	-2.4000	0.3248	0.2706	0.0542	20.0439
15	-2.2000	0.3367	0.2813	0.0554	19.7054
16	-2.0000	0.3489	0.2923	0.0566	19.3575
17	-1.8000	0.3613	0.3037	0.0577	18.9996
18	-1.6000	0.3741	0.3154	0.0588	18.6313
19	-1.4000	0.3872	0.3274	0.0598	18.2519
20	-1.2000	0.4005	0.3398	0.0607	17.8609
21	-1.0000	0.4141	0.3526	0.0615	17.4577
22	-0.8000	0.4280	0.3657	0.0623	17.0415
23	-0.6000	0.4421	0.3791	0.0630	16.6117
24	-0.4000	0.4565	0.3930	0.0635	16.1675
25	-0.2000	0.4711	0.4072	0.0640	15.7080
26	0.0000	0.4859	0.4217	0.0642	15.2325
27	0.1871	0.5000	0.4356	0.0644	14.7724
28	0.2000	0.5010	0.4366	0.0644	14.7399
29	0.4000	0.5162	0.4519	0.0643	14.2295
30	0.6000	0.5316	0.4675	0.0641	13.7002
31	0.8000	0.5471	0.4835	0.0636	13.1510
32	1.0000	0.5628	0.4999	0.0629	12.5809
33	1.2000	0.5786	0.5166	0.0619	11.9887
34	1.4000	0.5944	0.5337	0.0607	11.3736
35	1.6000	0.6104	0.5511	0.0593	10.7597
36	1.8000	0.6270	0.5689	0.0581	10.2106
37	2.0000	0.6442	0.5871	0.0571	9.7259
38	2.2000	0.6619	0.6056	0.0563	9.3017
39	2.4000	0.6802	0.6244	0.0558	8.9342
40	2.6000	0.6991	0.6437	0.0555	8.6193

Table 13

FIG. 37

	SNR	Opt. Cap	Std. Cap	Gain [bits]	Gain %
Design #					
41	2.8000	0.7186	0.6632	0.0554	8.3527
42	3.0000	0.7386	0.6831	0.0555	8.1300
43	3.2000	0.7593	0.7034	0.0559	7.9468
44	3.4000	0.7804	0.7240	0.0565	7.7983
45	3.6000	0.8021	0.7449	0.0572	7.6801
46	3.8000	0.8243	0.7662	0.0581	7.5872
47	4.0000	0.8470	0.7878	0.0592	7.5148
48	4.2000	0.8702	0.8098	0.0604	7.4581
49	4.4000	0.8938	0.8321	0.0617	7.4120
50	4.6000	0.9178	0.8548	0.0630	7.3718
51	4.8000	0.9421	0.8778	0.0644	7.3328
52	5.0000	0.9668	0.9011	0.0657	7.2903
53	5.2000	0.9917	0.9248	0.0670	7.2406
54	5.2657	1.0000	0.9326	0.0674	7.2219
55	5.4000	1.0169	0.9488	0.0681	7.1793
56	5.6000	1.0423	0.9732	0.0691	7.1031
57	5.8000	1.0678	0.9979	0.0699	7.0087
58	6.0000	1.0934	1.0229	0.0705	6.8934
59	6.2000	1.1191	1.0483	0.0708	6.7550
60	6.4000	1.1448	1.0740	0.0708	6.5919
61	6.6000	1.1704	1.1000	0.0704	6.4032
62	6.8000	1.1960	1.1263	0.0697	6.1889
63	7.0000	1.2216	1.1530	0.0686	5.9490
64	7.2000	1.2470	1.1799	0.0671	5.6843
65	7.4000	1.2724	1.2072	0.0652	5.4035
66	7.6000	1.2980	1.2348	0.0632	5.1173
67	7.8000	1.3238	1.2626	0.0612	4.8477
68	8.0000	1.3500	1.2907	0.0593	4.5905
69	8.2000	1.3780	1.3191	0.0589	4.4669
70	8.4000	1.4086	1.3477	0.0609	4.5190
71	8.6000	1.4392	1.3766	0.0626	4.5447
72	8.8000	1.4696	1.4057	0.0639	4.5449
73	9.0000	1.4999	1.4350	0.0649	4.5208
74	9.0008	1.5000	1.4351	0.0649	4.5207
75	9.2000	1.5300	1.4645	0.0655	4.4740
76	9.4000	1.5600	1.4942	0.0658	4.4056
77	9.6000	1.5899	1.5241	0.0658	4.3170
78	9.8000	1.6195	1.5541	0.0654	4.2101
79	10.0000	1.6490	1.5843	0.0647	4.0864
80	10.2000	1.6783	1.6145	0.0637	3.9475

Table 14

FIG. 38

	SNR	Opt. Cap	Std. Cap	Gain [bits]	Gain %
Design #					
81	10.4000	1.7074	1.6449	0.0624	3.7953
82	10.6000	1.7363	1.6754	0.0609	3.6327
83	10.8000	1.7650	1.7060	0.0591	3.4625
84	11.0000	1.7937	1.7366	0.0571	3.2884
85	11.2000	1.8223	1.7672	0.0551	3.1155
86	11.4000	1.8509	1.7979	0.0530	2.9491
87	11.6000	1.8797	1.8286	0.0511	2.7943
88	11.8000	1.9086	1.8593	0.0494	2.6548
89	12.0000	1.9378	1.8899	0.0478	2.5317
90	12.2000	1.9671	1.9206	0.0466	2.4250
91	12.4000	1.9966	1.9511	0.0455	2.3327
92	12.4227	2.0000	1.9546	0.0454	2.3230
93	12.6000	2.0263	1.9816	0.0446	2.2522
94	12.8000	2.0559	2.0121	0.0439	2.1810
95	13.0000	2.0856	2.0424	0.0432	2.1167
96	13.2000	2.1153	2.0726	0.0426	2.0569
97	13.4000	2.1448	2.1028	0.0421	1.9998
98	13.6000	2.1742	2.1328	0.0415	1.9437
99	13.8000	2.2035	2.1627	0.0408	1.8875
100	14.0000	2.2326	2.1925	0.0401	1.8301
101	14.2000	2.2614	2.2221	0.0394	1.7711
102	14.4000	2.2901	2.2516	0.0385	1.7096
103	14.6000	2.3184	2.2809	0.0375	1.6457
104	14.8000	2.3465	2.3100	0.0365	1.5792
105	15.0000	2.3743	2.3390	0.0353	1.5104
106	15.2000	2.4018	2.3678	0.0341	1.4395
107	15.4000	2.4290	2.3963	0.0328	1.3670
108	15.6000	2.4559	2.4246	0.0314	1.2934
109	15.8000	2.4825	2.4526	0.0299	1.2192
110	15.9336	2.5000	2.4711	0.0289	1.1703
111	16.0000	2.5087	2.4802	0.0284	1.1457
112	16.2000	2.5344	2.5076	0.0269	1.0722
113	16.4000	2.5598	2.5345	0.0253	1.0000
114	16.6000	2.5848	2.5610	0.0238	0.9296
115	16.8000	2.6093	2.5870	0.0223	0.8615
116	17.0000	2.6332	2.6124	0.0208	0.7960
117	17.2000	2.6567	2.6373	0.0193	0.7333
118	17.4000	2.6795	2.6616	0.0179	0.6737
119	17.6000	2.7017	2.6851	0.0166	0.6171
120	17.8000	2.7232	2.7080	0.0153	0.5637

Table 15

FIG. 39

	SNR	Opt. Cap	Std. Cap	Gain [bits]	Gain %
Design #					
121	18.0000	2.7440	2.7300	0.0140	0.5134
122	18.2000	2.7641	2.7513	0.0128	0.4663
123	18.4000	2.7834	2.7717	0.0117	0.4222
124	18.6000	2.8018	2.7912	0.0106	0.3810

Table 16

FIG. 40

	Label							
	0	1	2	3	4	5	6	7
Design #								
1	-4.583	-4.583	-4.582	-4.583	4.583	4.583	4.583	4.583
2	-4.584	-4.584	-4.581	-4.582	4.584	4.582	4.582	4.582
3	-4.584	-4.582	-4.582	-4.582	4.584	4.584	4.579	4.584
4	-4.584	-4.582	-4.582	-4.582	4.583	4.583	4.582	4.583
5	-4.583	-4.583	-4.583	-4.583	4.586	4.586	4.579	4.579
6	-4.585	-4.582	-4.582	-4.582	4.584	4.584	4.580	4.583
7	-4.587	-4.587	-4.578	-4.578	4.583	4.583	4.582	4.583
8	-4.585	-4.585	-4.580	-4.580	4.583	4.583	4.583	4.583
9	-4.583	-4.583	-4.582	-4.582	4.583	4.583	4.582	4.583
10	-4.585	-4.584	-4.581	-4.581	4.583	4.583	4.583	4.583
11	-4.583	-4.583	-4.583	-4.583	4.584	4.584	4.581	4.581
12	-4.583	-4.583	-4.582	-4.582	4.585	4.582	4.582	4.582
13	-4.587	-4.581	-4.581	-4.581	4.587	4.582	4.581	4.581
14	-4.583	-4.583	-4.582	-4.583	4.583	4.583	4.582	4.583
15	-4.583	-4.583	-4.582	-4.582	4.583	4.583	4.582	4.583
16	-4.583	-4.583	-4.582	-4.583	4.583	4.583	4.583	4.583
17	-4.587	-4.582	-4.580	-4.581	4.587	4.582	4.581	4.582
18	-4.583	-4.583	-4.582	-4.583	4.584	4.584	4.581	4.581
19	-4.583	-4.583	-4.582	-4.582	4.584	4.584	4.581	4.582
20	-4.583	-4.583	-4.582	-4.582	4.583	4.583	4.582	4.582
21	-4.583	-4.583	-4.582	-4.583	4.583	4.584	4.582	4.582
22	-4.584	-4.584	-4.580	-4.583	4.587	4.588	4.576	4.579
23	-4.589	-4.586	-4.578	-4.578	4.588	4.581	4.581	4.581
24	-4.584	-4.584	-4.581	-4.581	4.583	4.583	4.582	4.583
25	-4.585	-4.582	-4.582	-4.582	4.584	4.583	4.582	4.582
26	-4.583	-4.583	-4.583	-4.583	4.583	4.583	4.582	4.583
27	-4.584	-4.583	-4.582	-4.582	4.583	4.583	4.582	4.582
28	-4.583	-4.583	-4.583	-4.583	4.583	4.583	4.582	4.582
29	-4.583	-4.582	-4.582	-4.582	4.583	4.583	4.583	4.583
30	-4.587	-4.587	-4.578	-4.579	4.587	4.587	4.579	4.579
31	-4.584	-4.583	-4.582	-4.582	4.584	4.584	4.581	4.582
32	-4.583	-4.583	-4.582	-4.582	4.583	4.583	4.582	4.582
33	-4.584	-4.584	-4.578	-4.584	4.584	4.584	4.580	4.582
34	-4.584	-4.584	-4.578	-4.584	4.584	4.584	4.578	4.584
35	-5.110	-5.110	-3.986	-3.986	5.110	5.110	3.986	3.986
36	-5.355	-5.354	-3.651	-3.651	5.355	5.355	3.650	3.650
37	-5.515	-5.514	-3.404	-3.404	5.515	5.515	3.404	3.404
38	-5.638	-5.638	-3.196	-3.196	5.640	5.637	3.196	3.196
39	-5.729	-5.729	-3.029	-3.029	5.729	5.729	3.029	3.029
40	-5.808	-5.807	-2.876	-2.876	5.808	5.808	2.876	2.876

Table 17

FIG. 41

	Label							
	0	1	2	3	4	5	6	7
Design #								
41	-5.874	-5.874	-2.739	-2.739	5.874	5.872	2.740	2.740
42	-5.929	-5.929	-2.617	-2.617	5.929	5.929	2.617	2.617
43	-5.978	-5.975	-2.506	-2.506	5.978	5.976	2.505	2.505
44	-6.018	-6.018	-2.405	-2.405	6.018	6.018	2.405	2.405
45	-6.055	-6.054	-2.312	-2.312	6.054	6.054	2.312	2.312
46	-6.087	-6.085	-2.227	-2.227	6.087	6.086	2.227	2.227
47	-6.113	-6.113	-2.151	-2.151	6.113	6.113	2.151	2.151
48	-6.138	-6.138	-2.081	-2.081	6.138	6.137	2.081	2.081
49	-6.159	-6.159	-2.017	-2.017	6.159	6.159	2.017	2.017
50	-6.179	-6.176	-1.960	-1.960	6.178	6.178	1.959	1.959
51	-6.194	-6.193	-1.907	-1.907	6.194	6.194	1.907	1.907
52	-6.208	-6.208	-1.860	-1.860	6.208	6.208	1.860	1.860
53	-6.221	-6.220	-1.819	-1.819	6.221	6.219	1.819	1.820
54	-6.224	-6.224	-1.807	-1.807	6.224	6.224	1.807	1.807
55	-6.231	-6.230	-1.783	-1.783	6.231	6.231	1.783	1.783
56	-6.240	-6.240	-1.752	-1.752	6.242	6.237	1.752	1.752
57	-6.247	-6.247	-1.725	-1.725	6.247	6.247	1.725	1.725
58	-6.254	-6.253	-1.703	-1.703	6.253	6.253	1.703	1.703
59	-6.260	-6.256	-1.686	-1.686	6.260	6.256	1.686	1.686
60	-6.261	-6.261	-1.673	-1.673	6.261	6.261	1.673	1.673
61	-6.263	-6.263	-1.665	-1.665	6.263	6.263	1.665	1.665
62	-6.264	-6.264	-1.661	-1.661	6.264	6.264	1.661	1.661
63	-6.265	-6.265	-1.660	-1.660	6.265	6.264	1.660	1.660
64	-6.264	-6.264	-1.663	-1.663	6.291	6.237	1.658	1.667
65	-6.734	-5.796	-1.570	-1.737	6.244	6.244	1.674	1.674
66	-6.781	-5.697	-1.582	-1.750	6.781	5.697	1.582	1.750
67	-6.914	-5.533	-1.550	-1.781	6.915	5.533	1.549	1.781
68	-7.016	-5.403	-1.517	-1.809	7.017	5.403	1.517	1.809
69	-7.923	-3.658	7.923	-2.800	2.800	0.035	3.659	-0.035
70	-7.913	-3.668	7.913	-2.816	2.816	0.052	3.668	-0.052
71	-7.902	-3.680	7.902	-2.831	2.831	0.068	3.680	-0.068
72	-7.890	-3.694	7.890	-2.845	2.845	0.084	3.694	-0.084
73	-7.878	-3.710	7.878	-2.859	2.859	0.099	3.710	-0.099
74	-7.878	-3.710	7.878	-2.859	2.859	0.099	3.710	-0.099
75	-7.864	-3.728	7.864	-2.872	2.872	0.115	3.728	-0.115
76	-7.850	-3.749	7.850	-2.883	2.883	0.131	3.749	-0.131
77	-7.835	-3.772	7.835	-2.893	2.893	0.148	3.772	-0.148
78	-7.819	-3.798	7.819	-2.902	2.902	0.166	3.798	-0.166
79	-7.802	-3.827	7.802	-2.908	2.908	0.185	3.827	-0.185
80	-7.784	-3.859	7.784	-2.911	2.911	0.206	3.859	-0.206

Table 18

FIG. 42

	Label							
	0	1	2	3	4	5	6	7
Design #								
81	-7.765	-3.896	7.765	-2.911	2.911	0.230	3.896	-0.230
82	-7.745	-3.937	7.745	-2.907	2.907	0.257	3.937	-0.257
83	-7.724	-3.983	7.724	-2.897	2.897	0.290	3.983	-0.290
84	-7.701	-4.036	7.701	-2.880	2.880	0.328	4.036	-0.328
85	-7.677	-4.095	7.677	-2.857	2.857	0.374	4.095	-0.374
86	-7.651	-4.157	7.651	-2.828	2.829	0.425	4.157	-0.425
87	-7.625	-4.220	7.625	-2.797	2.797	0.479	4.220	-0.479
88	-7.600	-4.280	7.600	-2.765	2.765	0.533	4.280	-0.533
89	-7.576	-4.334	7.576	-2.734	2.734	0.585	4.334	-0.585
90	-7.555	-4.382	7.555	-2.707	2.707	0.632	4.382	-0.632
91	-7.536	-4.423	7.536	-2.682	2.682	0.672	4.423	-0.672
92	-7.534	-4.428	7.534	-2.680	2.680	0.677	4.428	-0.677
93	-7.519	-4.459	7.519	-2.662	2.662	0.707	4.459	-0.707
94	-7.504	-4.489	7.504	-2.644	2.644	0.736	4.489	-0.736
95	-7.491	-4.515	7.491	-2.630	2.630	0.761	4.515	-0.761
96	-7.479	-4.538	7.479	-2.618	2.618	0.780	4.538	-0.780
97	-7.469	-4.558	7.469	-2.609	2.609	0.796	4.558	-0.796
98	-7.459	-4.576	7.459	-2.603	2.603	0.808	4.576	-0.808
99	-7.449	-4.593	7.449	-2.598	2.599	0.818	4.593	-0.817
100	-7.439	-4.608	7.439	-2.597	2.597	0.825	4.608	-0.825
101	-7.430	-4.623	7.430	-2.597	2.597	0.831	4.623	-0.830
102	-7.420	-4.636	7.420	-2.599	2.599	0.835	4.636	-0.835
103	-7.410	-4.650	7.410	-2.603	2.603	0.838	4.650	-0.838
104	-7.399	-4.663	7.399	-2.608	2.608	0.841	4.663	-0.841
105	-7.389	-4.675	7.388	-2.615	2.615	0.844	4.675	-0.844
106	-7.377	-4.688	7.377	-2.624	2.624	0.847	4.688	-0.847
107	-7.366	-4.700	7.366	-2.634	2.633	0.850	4.700	-0.850
108	-7.354	-4.712	7.354	-2.644	2.644	0.854	4.712	-0.854
109	-7.342	-4.724	7.342	-2.656	2.656	0.858	4.724	-0.858
110	-7.334	-4.732	-0.862	-2.661	7.334	4.732	0.862	2.661
111	-7.330	-4.736	-0.863	-2.666	7.329	4.736	0.863	2.666
112	-7.317	-4.747	-0.868	-2.679	7.317	4.747	0.868	2.679
113	-7.304	-4.758	-0.873	-2.693	7.304	4.758	0.873	2.693
114	-7.292	-4.768	-0.878	-2.707	7.292	4.768	0.878	2.707
115	-7.279	-4.778	-0.884	-2.720	7.279	4.778	0.884	2.720
116	-7.267	-4.788	-0.889	-2.733	7.267	4.788	0.889	2.733
117	-7.255	-4.798	-0.894	-2.746	7.256	4.798	0.894	2.746
118	-7.244	-4.807	-0.899	-2.758	7.244	4.807	0.899	2.758
119	-7.233	-4.816	-0.904	-2.770	7.233	4.816	0.904	2.770
120	-7.223	-4.824	-0.909	-2.781	7.223	4.824	0.909	2.781

Table 19

FIG. 43

	Label							
	0	1	2	3	4	5	6	7
Design #								
121	-7.212	-4.832	-0.914	-2.792	7.212	4.832	0.914	2.792
122	-7.203	-4.840	-0.918	-2.802	7.203	4.840	0.918	2.802
123	-7.194	-4.847	-0.922	-2.812	7.194	4.847	0.922	2.812
124	-7.185	-4.854	-0.926	-2.821	7.185	4.854	0.926	2.821

Table 20

FIG. 44

Design #	SNRs	5.00%	40.00%	50.00%	60.00%	70.00%	100.00%
65	7.4	0.62	0.22	0.2	0.18	0.16	0
66	7.6	0.55	0.21	0.19	0.17	0.15	0
67	7.8	0.57	0.26	0.23	0.21	0.19	0
68	8	0.5	0.3	0.27	0.24	0.22	0
69	8.2	0.46	0.34	0.3	0.27	0.25	0
70	8.4	0.45	0.33	0.3	0.27	0.24	0
71	8.6	0.44	0.33	0.3	0.27	0.24	0
72	8.8	0.48	0.32	0.29	0.26	0.24	0
73	9	0.47	0.32	0.29	0.26	0.23	0
74	9	0.47	0.32	0.29	0.26	0.23	0
75	9.2	0.46	0.31	0.28	0.25	0.23	0
76	9.4	0.45	0.3	0.27	0.25	0.22	0
77	9.6	0.43	0.3	0.27	0.24	0.22	0
78	9.8	0.42	0.29	0.26	0.23	0.21	0
79	10	0.41	0.28	0.25	0.23	0.21	0
80	10.2	0.4	0.27	0.25	0.22	0.2	0
81	10.4	0.39	0.27	0.24	0.22	0.19	0
82	10.6	0.42	0.26	0.23	0.21	0.19	0
83	10.8	0.39	0.26	0.23	0.21	0.19	0
84	11	0.37	0.25	0.23	0.2	0.18	0
85	11.2	0.37	0.25	0.22	0.2	0.18	0
86	11.4	0.33	0.25	0.22	0.2	0.18	0
87	11.6	0.29	0.24	0.22	0.2	0.18	0
88	11.8	0.24	0.22	0.2	0.18	0.16	0
89	12	0.22	0.2	0.18	0.16	0.14	0
90	12.2	0.2	0.18	0.17	0.15	0.13	0
91	12.4	0.19	0.17	0.15	0.13	0.12	0
92	12.42	0.19	0.17	0.15	0.13	0.12	0
93	12.6	0.18	0.16	0.14	0.12	0.11	0
94	12.8	0.17	0.16	0.14	0.13	0.11	0
95	13	0.17	0.15	0.13	0.12	0.11	0
96	13.2	0.16	0.14	0.13	0.12	0.11	0
97	13.4	0.16	0.14	0.13	0.11	0.1	0
98	13.6	0.15	0.14	0.13	0.11	0.1	0
99	13.8	0.16	0.15	0.13	0.12	0.11	0
100	14	0.17	0.16	0.14	0.13	0.11	0
101	14.2	0.19	0.17	0.15	0.14	0.12	0
102	14.4	0.2	0.18	0.16	0.14	0.12	0
103	14.6	0.21	0.19	0.17	0.15	0.11	0
104	14.8	0.2	0.18	0.16	0.14	0.1	0

Table 21

FIG. 45

Design #	SNRs	5.00%	40.00%	50.00%	60.00%	70.00%	100.00%
105	15	0.19	0.17	0.15	0.14	0.1	0
106	15.2	0.19	0.18	0.16	0.14	0.1	0
107	15.4	0.18	0.16	0.15	0.13	0.1	0
108	15.6	0.17	0.15	0.14	0.13	0.09	0
109	15.8	0.16	0.14	0.13	0.12	0.09	0
110	15.93	0.15	0.13	0.12	0.11	0.08	0
111	16	0.15	0.14	0.12	0.11	0.08	0
112	16.2	0.14	0.12	0.11	0.1	0.07	0
113	16.4	0.13	0.12	0.11	0.1	0.07	0
114	16.6	0.13	0.11	0.1	0.09	0.07	0
115	16.8	0.12	0.11	0.1	0.09	0.06	0
116	17	0.11	0.1	0.09	0.08	0.06	0
117	17.2	0.11	0.1	0.09	0.08	0.06	0
118	17.4	0.1	0.09	0.08	0.08	0.06	0
119	17.6	0.1	0.09	0.08	0.07	0.05	0
120	17.8	0.09	0.09	0.08	0.07	0.05	0
121	18	0.09	0.08	0.07	0.07	0.05	0
122	18.2	0.09	0.08	0.07	0.06	0.05	0
123	18.4	0.08	0.07	0.07	0.06	0.04	0
124	18.6	0.08	0.07	0.06	0.06	0.04	0

Table 22

FIG. 46

	SNR	Opt. Cap	Std. Cap	Gain [bits]	Gain %
Design #					
1	-5.0000	0.1982	0.1980	0.0002	0.0812
2	-4.8000	0.2063	0.2061	0.0002	0.0902
3	-4.6000	0.2147	0.2145	0.0002	0.1001
4	-4.4000	0.2234	0.2232	0.0002	0.1110
5	-4.2000	0.2324	0.2321	0.0003	0.1229
6	-4.0000	0.2417	0.2414	0.0003	0.1359
7	-3.8000	0.2514	0.2510	0.0004	0.1501
8	-3.6000	0.2613	0.2609	0.0004	0.1656
9	-3.4000	0.2715	0.2710	0.0005	0.1825
10	-3.2000	0.2821	0.2816	0.0006	0.2009
11	-3.0000	0.2930	0.2924	0.0006	0.2209
12	-2.8000	0.3043	0.3036	0.0007	0.2425
13	-2.6000	0.3159	0.3151	0.0008	0.2659
14	-2.4000	0.3279	0.3269	0.0010	0.2911
15	-2.2000	0.3402	0.3391	0.0011	0.3183
16	-2.0000	0.3529	0.3516	0.0012	0.3476
17	-1.8000	0.3659	0.3645	0.0014	0.3791
18	-1.6000	0.3793	0.3777	0.0016	0.4128
19	-1.4000	0.3930	0.3913	0.0018	0.4488
20	-1.2000	0.4072	0.4052	0.0020	0.4872
21	-1.0000	0.4217	0.4195	0.0022	0.5281
22	-0.8000	0.4366	0.4341	0.0025	0.5715
23	-0.6000	0.4519	0.4491	0.0028	0.6175
24	-0.4000	0.4675	0.4644	0.0031	0.6663
25	-0.2000	0.4835	0.4801	0.0034	0.7177
26	0.0000	0.4999	0.4961	0.0038	0.7719
27	0.0008	0.5000	0.4962	0.0038	0.7658
28	0.2000	0.5167	0.5125	0.0042	0.8289
29	0.4000	0.5339	0.5292	0.0047	0.8886
30	0.6000	0.5514	0.5462	0.0052	0.9511
31	0.8000	0.5694	0.5636	0.0057	1.0164
32	1.0000	0.5877	0.5814	0.0063	1.0844
33	1.2000	0.6063	0.5994	0.0069	1.1552
34	1.4000	0.6254	0.6178	0.0076	1.2283
35	1.6000	0.6448	0.6365	0.0083	1.3040
36	1.8000	0.6646	0.6555	0.0091	1.3820
37	2.0000	0.6847	0.6748	0.0099	1.4625
38	2.2000	0.7052	0.6945	0.0107	1.5451
39	2.4000	0.7260	0.7144	0.0116	1.6297
40	2.6000	0.7472	0.7346	0.0126	1.7162

Table 23

FIG. 47

	SNR	Opt. Cap	Std. Cap	Gain [bits]	Gain %
Design #					
41	2.8000	0.7688	0.7551	0.0136	1.8045
42	3.0000	0.7906	0.7759	0.0147	1.8944
43	3.2000	0.8128	0.7970	0.0158	1.9858
44	3.4000	0.8354	0.8184	0.0170	2.0783
45	3.6000	0.8582	0.8400	0.0182	2.1719
46	3.8000	0.8814	0.8619	0.0195	2.2663
47	4.0000	0.9049	0.8840	0.0209	2.3612
48	4.2000	0.9286	0.9064	0.0223	2.4564
49	4.4000	0.9527	0.9290	0.0237	2.5516
50	4.6000	0.9771	0.9519	0.0252	2.6465
51	4.7864	1.0000	0.9734	0.0266	2.7327
52	4.8000	1.0017	0.9750	0.0267	2.7407
53	5.0000	1.0266	0.9983	0.0283	2.8339
54	5.2000	1.0517	1.0218	0.0299	2.9256
55	5.4000	1.0771	1.0456	0.0315	3.0153
56	5.6000	1.1028	1.0696	0.0332	3.1025
57	5.8000	1.1286	1.0938	0.0349	3.1868
58	6.0000	1.1547	1.1182	0.0366	3.2699
59	6.2000	1.1810	1.1427	0.0383	3.3517
60	6.4000	1.2076	1.1675	0.0401	3.4318
61	6.6000	1.2343	1.1925	0.0419	3.5103
62	6.8000	1.2613	1.2176	0.0437	3.5868
63	7.0000	1.2885	1.2430	0.0455	3.6606
64	7.2000	1.3158	1.2685	0.0473	3.7311
65	7.4000	1.3433	1.2941	0.0491	3.7978
66	7.6000	1.3710	1.3200	0.0510	3.8609
67	7.8000	1.3988	1.3460	0.0528	3.9211
68	8.0000	1.4268	1.3722	0.0546	3.9785
69	8.2000	1.4549	1.3985	0.0564	4.0328
70	8.4000	1.4832	1.4250	0.0582	4.0837
71	8.5186	1.5000	1.4408	0.0592	4.1088
72	8.6000	1.5116	1.4516	0.0600	4.1311
73	8.8000	1.5401	1.4784	0.0617	4.1748
74	9.0000	1.5688	1.5053	0.0635	4.2162
75	9.2000	1.5976	1.5324	0.0652	4.2547
76	9.4000	1.6265	1.5596	0.0669	4.2906
77	9.6000	1.6555	1.5869	0.0686	4.3237
78	9.8000	1.6846	1.6143	0.0703	4.3538
79	10.0000	1.7138	1.6419	0.0719	4.3805
80	10.2000	1.7431	1.6696	0.0735	4.4034

Table 24

FIG. 48

	SNR	Opt. Cap	Std. Cap	Gain [bits]	Gain %
Design #					
81	10.4000	1.7725	1.6974	0.0751	4.4223
82	10.6000	1.8019	1.7254	0.0765	4.4366
83	10.8000	1.8314	1.7534	0.0780	4.4462
84	11.0000	1.8609	1.7816	0.0793	4.4514
85	11.2000	1.8905	1.8099	0.0806	4.4542
86	11.4000	1.9202	1.8383	0.0819	4.4549
87	11.6000	1.9499	1.8667	0.0831	4.4534
88	11.8000	1.9797	1.8953	0.0843	4.4497
89	11.9363	2.0000	1.9149	0.0851	4.4441
90	12.0000	2.0095	1.9240	0.0855	4.4438
91	12.2000	2.0394	1.9528	0.0866	4.4355
92	12.4000	2.0694	1.9817	0.0877	4.4249
93	12.6000	2.0994	2.0107	0.0887	4.4121
94	12.8000	2.1294	2.0397	0.0897	4.3969
95	13.0000	2.1595	2.0689	0.0906	4.3798
96	13.2000	2.1896	2.0981	0.0915	4.3610
97	13.4000	2.2197	2.1274	0.0923	4.3403
98	13.6000	2.2499	2.1568	0.0931	4.3178
99	13.8000	2.2801	2.1863	0.0939	4.2934
100	14.0000	2.3104	2.2158	0.0946	4.2671
101	14.2000	2.3406	2.2454	0.0952	4.2389
102	14.4000	2.3709	2.2751	0.0958	4.2085
103	14.6000	2.4012	2.3049	0.0963	4.1761
104	14.8000	2.4314	2.3347	0.0967	4.1414
105	15.0000	2.4617	2.3646	0.0971	4.1045
106	15.2000	2.4920	2.3946	0.0974	4.0654
107	15.2531	2.5000	2.4026	0.0974	4.0539
108	15.4000	2.5222	2.4247	0.0976	4.0241
109	15.6000	2.5525	2.4547	0.0977	3.9805
110	15.8000	2.5827	2.4849	0.0978	3.9347
111	16.0000	2.6129	2.5151	0.0978	3.8868
112	16.2000	2.6430	2.5454	0.0977	3.8366
113	16.4000	2.6732	2.5757	0.0975	3.7842
114	16.6000	2.7033	2.6061	0.0972	3.7296
115	16.8000	2.7333	2.6365	0.0968	3.6729
116	17.0000	2.7634	2.6670	0.0964	3.6139
117	17.2000	2.7933	2.6975	0.0958	3.5527
118	17.4000	2.8233	2.7281	0.0952	3.4893
119	17.6000	2.8531	2.7587	0.0944	3.4237
120	17.8000	2.8829	2.7893	0.0936	3.3558

Table 25

FIG. 49

	SNR	Opt. Cap	Std. Cap	Gain [bits]	Gain %
Design #					
121	18.0000	2.9127	2.8200	0.0927	3.2856
122	18.2000	2.9424	2.8508	0.0916	3.2130
123	18.4000	2.9720	2.8815	0.0904	3.1382
124	18.5898	3.0000	2.9108	0.0892	3.0644
125	18.6000	3.0015	2.9123	0.0891	3.0610
126	18.8000	3.0309	2.9432	0.0877	2.9814
127	19.0000	3.0603	2.9740	0.0862	2.8995
128	19.2000	3.0895	3.0049	0.0846	2.8153
129	19.4000	3.1187	3.0358	0.0828	2.7288
130	19.6000	3.1477	3.0667	0.0810	2.6400
131	19.8000	3.1766	3.0977	0.0790	2.5491
132	20.0000	3.2054	3.1286	0.0768	2.4563
133	20.2000	3.2341	3.1594	0.0746	2.3616
134	20.4000	3.2626	3.1903	0.0723	2.2653
135	20.6000	3.2909	3.2211	0.0698	2.1677
136	20.8000	3.3191	3.2518	0.0673	2.0691
137	21.0000	3.3471	3.2824	0.0647	1.9700
138	21.2000	3.3749	3.3129	0.0620	1.8706
139	21.4000	3.4025	3.3433	0.0592	1.7714
140	21.6000	3.4298	3.3734	0.0564	1.6730
141	21.8000	3.4569	3.4033	0.0536	1.5758
142	22.0000	3.4837	3.4329	0.0508	1.4802
143	22.1229	3.5000	3.4510	0.0490	1.4199
144	22.2000	3.5102	3.4622	0.0480	1.3867
145	22.4000	3.5364	3.4911	0.0452	1.2956
146	22.6000	3.5621	3.5196	0.0425	1.2074
147	22.8000	3.5874	3.5476	0.0398	1.1222
148	23.0000	3.6123	3.5751	0.0372	1.0403
149	23.2000	3.6366	3.6019	0.0346	0.9619
150	23.4000	3.6603	3.6281	0.0322	0.8870
151	23.6000	3.6835	3.6537	0.0298	0.8158
152	23.8000	3.7059	3.6784	0.0275	0.7482
153	24.0000	3.7277	3.7023	0.0253	0.6842
154	24.2000	3.7487	3.7254	0.0232	0.6239
155	24.4000	3.7689	3.7476	0.0213	0.5672
156	24.6000	3.7882	3.7688	0.0194	0.5139
157	24.8000	3.8067	3.7891	0.0176	0.4641
158	25.0000	3.8242	3.8083	0.0159	0.4176
159	25.2000	3.8409	3.8266	0.0143	0.3744
160	25.4000	3.8566	3.8437	0.0129	0.3344

Table 26

FIG. 50

	SNR	Opt. Cap	Std. Cap	Gain [bits]	Gain %
Design #					
161	25.6000	3.8713	3.8598	0.0115	0.2974
162	25.8000	3.8851	3.8749	0.0102	0.2634
163	26.0000	3.8979	3.8889	0.0090	0.2323
164	26.2000	3.9097	3.9018	0.0079	0.2037
165	26.4000	3.9207	3.9137	0.0070	0.1779
166	26.6000	3.9306	3.9246	0.0061	0.1545
167	26.8000	3.9397	3.9345	0.0052	0.1334
168	27.0000	3.9479	3.9434	0.0045	0.1145
169	27.2000	3.9553	3.9515	0.0039	0.0977
170	27.4000	3.9619	3.9587	0.0033	0.0829
171	27.6000	3.9678	3.9650	0.0028	0.0698
172	27.8000	3.9729	3.9706	0.0023	0.0584
173	28.0000	3.9775	3.9755	0.0019	0.0485
174	28.2000	3.9814	3.9798	0.0016	0.0399
175	28.4000	3.9847	3.9834	0.0013	0.0326
176	28.6000	3.9876	3.9865	0.0011	0.0264
177	28.8000	3.9900	3.9892	0.0008	0.0212
178	29.0000	3.9920	3.9914	0.0007	0.0169
179	29.2000	3.9937	3.9932	0.0005	0.0134
180	29.4000	3.9951	3.9947	0.0004	0.0103

Table 27

FIG. 51

	Label							
	0	1	2	3	4	5	6	7
Design #								
1	-20.036	-6.369	-6.322	-6.315	-6.314	-6.302	-6.294	-6.240
2	-20.035	-6.309	-6.309	-6.309	-6.309	-6.309	-6.309	-6.309
3	-20.032	-6.337	-6.280	-6.271	-6.346	-6.289	-6.366	-6.282
4	-20.029	-6.320	-6.311	-6.311	-6.311	-6.311	-6.307	-6.307
5	-20.026	-6.323	-6.323	-6.323	-6.305	-6.305	-6.305	-6.305
6	-20.024	-6.335	-6.335	-6.335	-6.335	-6.335	-6.260	-6.260
7	-20.021	-6.315	-6.316	-6.316	-6.315	-6.317	-6.317	-6.313
8	-20.017	-6.320	-6.320	-6.320	-6.320	-6.320	-6.320	-6.300
9	-20.014	-6.341	-6.329	-6.329	-6.329	-6.300	-6.300	-6.300
10	-20.011	-6.308	-6.320	-6.316	-6.307	-6.343	-6.326	-6.318
11	-20.008	-6.363	-6.326	-6.318	-6.318	-6.318	-6.306	-6.300
12	-20.004	-6.333	-6.325	-6.325	-6.323	-6.323	-6.323	-6.310
13	-20.001	-6.336	-6.333	-6.320	-6.326	-6.317	-6.316	-6.323
14	-19.997	-6.323	-6.331	-6.323	-6.331	-6.327	-6.322	-6.325
15	-19.993	-6.328	-6.328	-6.328	-6.328	-6.328	-6.328	-6.328
16	-19.990	-6.332	-6.331	-6.331	-6.332	-6.324	-6.328	-6.326
17	-19.986	-6.331	-6.331	-6.331	-6.331	-6.331	-6.331	-6.331
18	-19.983	-6.332	-6.332	-6.332	-6.332	-6.332	-6.332	-6.332
19	-19.979	-6.339	-6.339	-6.336	-6.336	-6.330	-6.330	-6.330
20	-19.976	-6.332	-6.330	-6.336	-6.336	-6.346	-6.332	-6.339
21	-19.972	-6.362	-6.362	-6.362	-6.333	-6.315	-6.315	-6.312
22	-19.950	-6.582	-6.589	-6.596	-6.580	-6.574	-6.584	-4.681
23	-19.919	-6.734	-6.725	-6.725	-6.725	-6.724	-6.730	-3.421
24	-19.889	-6.822	-6.823	-6.821	-6.829	-6.826	-6.831	-2.221
25	-19.862	-6.899	-6.898	-6.901	-6.903	-6.894	-6.895	-0.058
26	-19.850	-6.922	-6.913	-6.913	-6.913	-6.911	-6.911	0.144
27	-19.840	-7.180	-7.160	-7.150	-7.140	-7.140	-5.430	-0.150
28	-19.823	-6.964	-6.962	-6.967	-6.955	-6.965	-6.961	0.939
29	-19.796	-7.238	-7.238	-7.238	-7.238	-7.233	-5.505	1.455
30	-19.756	-7.424	-7.426	-7.426	-7.426	-7.425	-4.126	1.219
31	-19.713	-7.576	-7.574	-7.574	-7.574	-7.574	-0.998	-0.906
32	-19.683	-7.631	-7.628	-7.630	-7.626	-7.627	-0.542	-0.543
33	-19.663	-7.660	-7.660	-7.660	-7.659	-7.659	0.000	0.000
34	-19.654	-7.668	-7.668	-7.668	-7.664	-7.655	-0.001	0.000
35	-19.597	-8.155	-8.155	-8.154	-8.154	-5.289	-0.161	-0.159
36	-19.601	-7.739	-7.739	-7.737	-7.737	-7.734	0.324	0.324
37	-19.507	-8.421	-8.421	-8.421	-8.421	-3.082	-0.540	-0.540
38	-19.551	-7.804	-7.804	-7.804	-7.804	-7.804	1.020	1.020
39	-19.445	-8.528	-8.528	-8.528	-8.528	-0.978	-0.977	-0.977
40	-19.418	-8.562	-8.562	-8.562	-8.562	-0.916	-0.916	-0.916

Table 28

FIG. 52

	Label							
	8	9	10	11	12	13	14	15
Design #								
1	6.314	6.351	6.351	6.315	6.320	6.236	6.269	20.036
2	6.159	6.287	6.287	6.287	6.381	6.381	6.381	20.034
3	6.316	6.262	6.286	6.298	6.298	6.296	6.414	20.032
4	6.248	6.309	6.309	6.328	6.328	6.328	6.328	20.029
5	6.303	6.303	6.303	6.303	6.326	6.326	6.326	20.026
6	6.200	6.267	6.267	6.267	6.398	6.398	6.398	20.023
7	6.309	6.312	6.318	6.316	6.320	6.320	6.313	20.020
8	6.273	6.321	6.321	6.321	6.321	6.330	6.330	20.017
9	6.302	6.302	6.308	6.329	6.329	6.329	6.329	20.014
10	6.312	6.312	6.326	6.311	6.325	6.325	6.328	20.011
11	6.321	6.321	6.321	6.321	6.321	6.321	6.321	20.007
12	6.320	6.320	6.320	6.324	6.326	6.326	6.326	20.004
13	6.317	6.322	6.322	6.323	6.327	6.323	6.335	20.001
14	6.323	6.329	6.328	6.324	6.323	6.324	6.332	19.997
15	6.324	6.324	6.324	6.324	6.326	6.333	6.337	19.993
16	6.324	6.323	6.328	6.325	6.327	6.336	6.341	19.990
17	6.328	6.328	6.330	6.332	6.332	6.332	6.334	19.986
18	6.331	6.331	6.331	6.331	6.333	6.333	6.338	19.983
19	6.330	6.331	6.333	6.333	6.337	6.337	6.337	19.979
20	6.333	6.336	6.339	6.339	6.334	6.328	6.340	19.975
21	6.313	6.313	6.313	6.355	6.355	6.355	6.355	19.972
22	4.681	6.578	6.571	6.582	6.587	6.603	6.582	19.950
23	3.421	6.716	6.716	6.722	6.737	6.738	6.734	19.919
24	2.221	6.820	6.831	6.822	6.830	6.826	6.822	19.889
25	0.059	6.893	6.894	6.902	6.901	6.901	6.899	19.862
26	0.144	5.429	7.147	7.147	7.154	7.154	7.169	19.843
27	-0.140	6.900	6.900	6.900	6.910	6.920	6.950	19.850
28	0.895	2.960	7.406	7.403	7.400	7.399	7.399	19.796
29	1.467	1.467	7.466	7.466	7.466	7.466	7.466	19.770
30	1.219	1.225	7.521	7.521	7.521	7.521	7.521	19.741
31	-0.906	2.985	7.536	7.537	7.537	7.537	7.545	19.719
32	-0.546	1.662	7.624	7.621	7.621	7.624	7.620	19.685
33	0.000	0.000	7.659	7.660	7.660	7.660	7.660	19.663
34	0.000	0.000	7.663	7.663	7.663	7.665	7.668	19.654
35	-0.159	-0.159	7.703	7.703	7.703	7.703	7.703	19.627
36	0.324	0.327	4.201	8.309	8.309	8.309	8.309	19.551
37	-0.540	-0.540	7.771	7.771	7.771	7.771	7.771	19.576
38	1.020	1.020	1.021	8.501	8.501	8.501	8.501	19.468
39	-0.977	-0.977	6.441	8.121	8.121	8.121	8.121	19.517
40	-0.915	-0.915	5.622	8.286	8.286	8.286	8.287	19.476

Table 29

FIG. 53

	Label							
	0	1	2	3	4	5	6	7
Design #								
41	-19.438	-8.393	-8.393	-8.393	-8.393	-5.030	0.855	0.855
42	-19.365	-8.624	-8.624	-8.624	-8.624	-0.796	-0.796	-0.795
43	-19.369	-8.542	-8.542	-8.542	-8.542	-4.089	0.735	0.735
44	-19.315	-8.681	-8.681	-8.681	-8.681	-0.676	-0.676	-0.675
45	-19.290	-8.706	-8.707	-8.707	-8.707	-0.617	-0.617	-0.617
46	-19.267	-8.731	-8.731	-8.731	-8.731	-0.559	-0.559	-0.558
47	-19.252	-8.724	-8.724	-8.724	-8.724	-2.617	0.500	0.500
48	-19.221	-8.776	-8.776	-8.776	-8.776	-0.444	-0.444	-0.444
49	-19.199	-8.796	-8.796	-8.796	-8.795	-0.388	-0.388	-0.388
50	-19.181	-8.805	-8.805	-8.805	-8.805	-1.696	0.329	0.329
51	-19.160	-8.820	-8.820	-8.820	-8.820	-1.430	0.280	0.280
52	-19.158	-8.831	-8.831	-8.831	-8.831	-0.285	-0.278	-0.278
53	-19.138	-8.846	-8.847	-8.846	-8.846	-0.241	-0.227	-0.241
54	-19.119	-8.860	-8.860	-8.860	-8.860	-0.702	-0.066	-0.066
55	-19.100	-8.873	-8.873	-8.873	-8.873	-0.232	-0.232	-0.212
56	-19.081	-8.884	-8.884	-8.884	-8.884	-0.360	-0.342	0.100
57	-19.043	-9.266	-9.266	-9.265	-7.601	-1.129	-1.129	0.534
58	-18.995	-9.478	-9.478	-9.478	-6.660	-1.335	-1.335	-1.335
59	-18.952	-9.606	-9.606	-9.606	-5.932	-1.717	-1.717	-1.715
60	-18.914	-9.697	-9.697	-9.697	-5.244	-2.057	-2.057	-2.056
61	-18.879	-9.767	-9.767	-9.767	-4.469	-2.412	-2.412	-2.412
62	-18.848	-9.816	-9.816	-9.816	-2.987	-2.987	-2.987	-2.987
63	-18.824	-9.832	-9.832	-9.832	-2.985	-2.985	-2.985	-2.985
64	-18.800	-9.848	-9.848	-9.848	-2.986	-2.986	-2.986	-2.986
65	-18.775	-9.862	-9.862	-9.862	-2.988	-2.988	-2.988	-2.988
66	-18.742	-10.161	-10.161	-9.278	-3.006	-3.006	-3.006	-3.006
67	-18.705	-10.362	-10.362	-8.862	-3.036	-3.036	-3.036	-3.036
68	-18.671	-10.482	-10.482	-8.612	-3.061	-3.061	-3.061	-3.061
69	-18.638	-10.573	-10.573	-8.428	-3.083	-3.083	-3.083	-3.083
70	-18.608	-10.645	-10.645	-8.285	-3.102	-3.102	-3.102	-3.102
71	-18.600	-10.660	-10.660	-8.250	-3.110	-3.110	-3.110	-3.110
72	-18.579	-10.705	-10.705	-8.170	-3.118	-3.118	-3.118	-3.118
73	-18.545	-10.797	-10.797	-7.881	-3.559	-3.559	-3.559	-1.674
74	-18.512	-10.880	-10.880	-7.584	-3.788	-3.788	-3.788	0.000
75	-18.481	-10.932	-10.932	-7.425	-3.867	-3.867	-3.867	0.259
76	-18.450	-11.005	-11.005	-6.996	-4.647	-4.647	-2.290	0.000
77	-18.421	-11.052	-11.052	-6.725	-4.860	-4.861	-1.978	0.000
78	-18.394	-11.089	-11.089	-6.487	-5.027	-5.027	-1.764	0.000
79	-18.366	-11.120	-11.120	-6.261	-5.182	-5.181	-1.146	-1.075
80	-18.339	-11.146	-11.146	-5.849	-5.849	-4.951	-1.079	-1.078

Table 30

FIG. 54

	Label							
	8	9	10	11	12	13	14	15
Design #								
41	0.855	0.855	0.856	8.594	8.594	8.594	8.594	19.391
42	-0.795	-0.792	4.532	8.475	8.475	8.475	8.476	19.403
43	0.735	0.735	0.737	8.653	8.653	8.653	8.653	19.340
44	-0.675	-0.675	3.684	8.599	8.599	8.599	8.599	19.338
45	-0.617	-0.617	3.307	8.646	8.646	8.646	8.647	19.308
46	-0.558	-0.558	2.953	8.688	8.688	8.688	8.688	19.279
47	0.500	0.501	0.502	8.754	8.754	8.754	8.754	19.243
48	-0.443	-0.443	2.296	8.755	8.755	8.755	8.755	19.227
49	-0.387	-0.387	1.989	8.782	8.782	8.782	8.782	19.203
50	0.335	0.335	0.336	8.814	8.814	8.814	8.814	19.178
51	0.280	0.290	0.290	8.830	8.830	8.830	8.830	19.160
52	-0.278	-0.278	1.416	8.826	8.826	8.826	8.826	19.159
53	-0.208	-0.224	1.152	8.843	8.844	8.844	8.844	19.139
54	0.002	0.148	0.683	8.860	8.860	8.860	8.860	19.119
55	-0.212	0.445	0.445	8.873	8.873	8.873	8.873	19.100
56	0.181	0.181	0.241	8.884	8.884	8.885	8.885	19.081
57	0.534	0.543	0.619	7.675	9.250	9.250	9.250	19.044
58	1.335	1.335	1.335	6.660	9.478	9.478	9.478	18.995
59	1.716	1.716	1.717	5.932	9.606	9.606	9.606	18.952
60	2.056	2.056	2.056	5.244	9.697	9.697	9.697	18.914
61	2.411	2.412	2.412	4.469	9.767	9.767	9.767	18.879
62	2.987	2.987	2.987	2.987	9.816	9.816	9.816	18.848
63	2.985	2.985	2.985	2.985	9.832	9.832	9.832	18.824
64	2.986	2.986	2.986	2.986	9.848	9.848	9.848	18.800
65	2.988	2.988	2.988	2.988	9.862	9.862	9.862	18.775
66	3.006	3.006	3.006	3.006	9.278	10.161	10.161	18.742
67	3.036	3.036	3.036	3.036	8.862	10.362	10.362	18.705
68	3.061	3.061	3.061	3.061	8.612	10.482	10.482	18.671
69	3.083	3.083	3.083	3.083	8.428	10.573	10.573	18.638
70	3.102	3.102	3.102	3.102	8.285	10.645	10.645	18.608
71	3.110	3.110	3.110	3.110	8.250	10.660	10.660	18.600
72	3.118	3.118	3.118	3.118	8.170	10.705	10.705	18.579
73	1.674	3.559	3.559	3.559	7.881	10.797	10.797	18.545
74	0.000	3.788	3.788	3.788	7.584	10.880	10.880	18.512
75	0.259	2.208	4.527	4.527	7.200	10.956	10.956	18.481
76	0.000	2.290	4.647	4.647	6.997	11.005	11.005	18.450
77	0.001	1.977	4.861	4.861	6.724	11.052	11.052	18.421
78	0.000	1.764	5.027	5.027	6.487	11.089	11.089	18.394
79	1.111	1.111	5.182	5.182	6.261	11.120	11.120	18.366
80	1.078	1.078	4.951	5.848	5.849	11.146	11.146	18.339

Table 31

FIG. 55

	Label							
	0	1	2	3	4	5	6	7
Design #								
81	-18.310	-11.166	-11.166	-5.820	-5.820	-5.038	-1.059	-1.059
82	-18.281	-11.184	-11.184	-5.829	-5.829	-5.042	-1.064	-1.064
83	-18.250	-11.200	-11.200	-5.869	-5.869	-4.977	-1.088	-1.088
84	-18.216	-11.625	-10.769	-6.029	-6.028	-4.637	-1.196	-1.196
85	-18.183	-11.856	-10.518	-6.167	-6.167	-4.318	-1.321	-1.321
86	-18.151	-12.003	-10.359	-6.260	-6.260	-4.096	-1.419	-1.419
87	-18.121	-12.114	-10.244	-6.327	-6.327	-3.928	-1.497	-1.497
88	-18.092	-12.202	-10.156	-6.378	-6.378	-3.800	-1.559	-1.559
89	-18.070	-12.250	-10.110	-6.410	-6.410	-3.730	-1.590	-1.590
90	-18.064	-12.276	-10.088	-6.417	-6.417	-3.703	-1.607	-1.607
91	-18.037	-12.339	-10.034	-6.448	-6.448	-3.630	-1.644	-1.643
92	-18.011	-12.397	-9.985	-6.483	-6.483	-3.412	-2.368	-0.967
93	-17.985	-12.447	-9.947	-6.510	-6.510	-2.960	-2.960	-0.633
94	-17.960	-12.496	-9.905	-6.787	-6.251	-2.977	-2.977	-0.578
95	-17.935	-12.548	-9.844	-7.024	-6.017	-3.029	-3.029	-0.316
96	-17.911	-12.592	-9.800	-7.137	-5.915	-3.056	-3.056	0.000
97	-17.887	-12.632	-9.760	-7.242	-5.805	-3.365	-2.785	0.000
98	-17.863	-12.668	-9.730	-7.318	-5.727	-3.481	-2.701	0.000
99	-17.839	-12.702	-9.704	-7.391	-5.629	-3.688	-2.476	-0.486
100	-17.814	-12.732	-9.684	-7.450	-5.545	-3.844	-2.283	-0.732
101	-17.789	-12.759	-9.675	-7.487	-5.497	-3.924	-2.181	-0.851
102	-17.763	-12.784	-9.674	-7.511	-5.476	-3.962	-2.136	-0.902
103	-17.736	-12.807	-9.678	-7.526	-5.473	-3.975	-2.128	-0.914
104	-17.708	-12.829	-9.687	-7.535	-5.482	-3.975	-2.140	-0.903
105	-17.679	-12.849	-9.700	-7.541	-5.496	-3.966	-2.162	-0.882
106	-17.650	-12.869	-9.716	-7.544	-5.514	-3.955	-2.187	-0.858
107	-17.640	-12.870	-9.720	-7.550	-5.520	-3.950	-2.190	-0.850
108	-17.619	-12.888	-9.734	-7.547	-5.533	-3.944	-2.212	-0.835
109	-17.588	-12.906	-9.753	-7.550	-5.552	-3.934	-2.234	-0.815
110	-17.556	-12.925	-9.774	-7.554	-5.571	-3.926	-2.253	-0.799
111	-17.523	-12.942	-9.795	-7.558	-5.588	-3.921	-2.269	-0.787
112	-17.490	-12.960	-9.818	-7.563	-5.604	-3.918	-2.282	-0.777
113	-17.456	-12.977	-9.841	-7.570	-5.619	-3.917	-2.293	-0.771
114	-17.421	-12.993	-9.864	-7.578	-5.633	-3.919	-2.301	-0.767
115	-17.385	-13.009	-9.888	-7.587	-5.646	-3.922	-2.308	-0.765
116	-17.349	-13.025	-9.913	-7.598	-5.659	-3.927	-2.314	-0.765
117	-17.312	-13.040	-9.938	-7.611	-5.671	-3.933	-2.320	-0.765
118	-17.274	-13.054	-9.963	-7.625	-5.683	-3.940	-2.325	-0.766
119	-17.235	-13.067	-9.989	-7.641	-5.695	-3.948	-2.329	-0.768
120	-17.196	-13.080	-10.015	-7.658	-5.708	-3.956	-2.334	-0.770

Table 32

FIG. 56

	Label							
	8	9	10	11	12	13	14	15
Design #								
81	1.059	1.059	5.038	5.820	5.820	11.166	11.166	18.310
82	1.064	1.064	5.042	5.829	5.829	11.184	11.184	18.281
83	1.088	1.088	4.977	5.869	5.869	11.200	11.200	18.250
84	1.196	1.196	4.637	6.028	6.028	10.769	11.625	18.216
85	1.321	1.321	4.318	6.167	6.167	10.518	11.856	18.183
86	1.419	1.419	4.096	6.260	6.260	10.359	12.003	18.151
87	1.497	1.497	3.928	6.327	6.327	10.244	12.114	18.121
88	1.559	1.559	3.800	6.378	6.378	10.156	12.202	18.092
89	1.590	1.590	3.730	6.410	6.410	10.110	12.250	18.070
90	1.607	1.607	3.703	6.417	6.417	10.088	12.276	18.064
91	1.644	1.644	3.630	6.448	6.448	10.034	12.339	18.037
92	0.967	2.369	3.412	6.483	6.483	9.985	12.397	18.011
93	0.633	2.960	2.960	6.510	6.510	9.947	12.447	17.985
94	0.578	2.977	2.977	6.251	6.787	9.905	12.496	17.960
95	0.316	3.029	3.029	6.017	7.024	9.844	12.548	17.935
96	0.000	3.056	3.056	5.915	7.137	9.800	12.592	17.911
97	0.000	2.785	3.365	5.805	7.242	9.760	12.632	17.887
98	0.000	2.701	3.481	5.727	7.318	9.730	12.668	17.863
99	0.486	2.476	3.688	5.629	7.391	9.704	12.702	17.839
100	0.732	2.283	3.844	5.545	7.450	9.684	12.732	17.814
101	0.851	2.181	3.924	5.497	7.487	9.675	12.759	17.789
102	0.902	2.136	3.962	5.476	7.511	9.674	12.784	17.763
103	0.914	2.128	3.975	5.473	7.526	9.678	12.807	17.736
104	0.903	2.140	3.975	5.482	7.535	9.687	12.829	17.708
105	0.882	2.162	3.966	5.496	7.541	9.700	12.849	17.679
106	0.858	2.187	3.955	5.514	7.544	9.716	12.869	17.650
107	0.850	2.190	3.950	5.520	7.550	9.720	12.870	17.640
108	0.835	2.212	3.944	5.533	7.547	9.734	12.888	17.619
109	0.815	2.234	3.934	5.552	7.550	9.753	12.906	17.588
110	0.799	2.253	3.926	5.571	7.554	9.774	12.925	17.556
111	0.787	2.269	3.921	5.588	7.558	9.795	12.942	17.523
112	0.777	2.282	3.918	5.604	7.563	9.818	12.960	17.490
113	0.771	2.293	3.917	5.619	7.570	9.841	12.977	17.456
114	0.767	2.301	3.919	5.633	7.578	9.864	12.993	17.421
115	0.765	2.308	3.922	5.646	7.587	9.888	13.009	17.385
116	0.765	2.314	3.927	5.659	7.598	9.913	13.025	17.349
117	0.765	2.320	3.933	5.671	7.611	9.938	13.040	17.312
118	0.766	2.325	3.940	5.683	7.625	9.963	13.054	17.274
119	0.768	2.329	3.948	5.695	7.641	9.989	13.067	17.235
120	0.770	2.334	3.956	5.708	7.658	10.015	13.080	17.196

Table 33

FIG. 57

	Label							
	0	1	2	3	4	5	6	7
Design #								
121	-17.156	-13.092	-10.041	-7.676	-5.720	-3.966	-2.339	-0.772
122	-17.115	-13.104	-10.068	-7.696	-5.734	-3.975	-2.344	-0.774
123	-17.074	-13.114	-10.095	-7.718	-5.748	-3.986	-2.349	-0.776
124	-17.030	-13.120	-10.120	-7.740	-5.760	-4.000	-2.350	-0.780
125	-17.031	-13.124	-10.122	-7.741	-5.762	-3.997	-2.355	-0.778
126	-16.988	-13.132	-10.150	-7.765	-5.778	-4.008	-2.362	-0.780
127	-16.944	-13.140	-10.177	-7.791	-5.795	-4.020	-2.368	-0.783
128	-16.900	-13.147	-10.205	-7.817	-5.814	-4.032	-2.376	-0.785
129	-16.854	-13.152	-10.232	-7.845	-5.833	-4.046	-2.383	-0.788
130	-16.809	-13.157	-10.259	-7.875	-5.855	-4.060	-2.392	-0.790
131	-16.762	-13.161	-10.286	-7.905	-5.877	-4.075	-2.401	-0.793
132	-16.715	-13.163	-10.313	-7.936	-5.901	-4.091	-2.410	-0.796
133	-16.667	-13.165	-10.339	-7.967	-5.927	-4.109	-2.420	-0.800
134	-16.619	-13.166	-10.365	-8.000	-5.955	-4.128	-2.431	-0.803
135	-16.570	-13.165	-10.390	-8.033	-5.983	-4.148	-2.443	-0.807
136	-16.521	-13.164	-10.415	-8.066	-6.014	-4.170	-2.456	-0.811
137	-16.471	-13.162	-10.439	-8.100	-6.045	-4.193	-2.470	-0.816
138	-16.422	-13.159	-10.462	-8.134	-6.077	-4.217	-2.484	-0.821
139	-16.372	-13.155	-10.484	-8.167	-6.111	-4.243	-2.500	-0.826
140	-16.323	-13.151	-10.506	-8.201	-6.144	-4.270	-2.517	-0.832
141	-16.273	-13.146	-10.527	-8.234	-6.179	-4.297	-2.534	-0.838
142	-16.225	-13.140	-10.547	-8.266	-6.213	-4.326	-2.552	-0.844
143	-16.190	-13.140	-10.560	-8.290	-6.230	-4.340	-2.560	-0.850
144	-16.176	-13.134	-10.566	-8.298	-6.247	-4.354	-2.571	-0.850
145	-16.129	-13.128	-10.585	-8.329	-6.281	-4.383	-2.589	-0.857
146	-16.083	-13.122	-10.603	-8.359	-6.313	-4.411	-2.608	-0.863
147	-16.038	-13.116	-10.620	-8.388	-6.345	-4.439	-2.627	-0.870
148	-15.994	-13.110	-10.636	-8.416	-6.376	-4.466	-2.645	-0.876
149	-15.952	-13.104	-10.652	-8.443	-6.406	-4.492	-2.662	-0.882
150	-15.911	-13.098	-10.667	-8.469	-6.435	-4.517	-2.679	-0.888
151	-15.872	-13.093	-10.681	-8.494	-6.462	-4.541	-2.695	-0.894
152	-15.834	-13.087	-10.695	-8.517	-6.488	-4.564	-2.710	-0.899
153	-15.798	-13.083	-10.708	-8.540	-6.513	-4.585	-2.725	-0.904
154	-15.763	-13.078	-10.721	-8.561	-6.536	-4.606	-2.739	-0.909
155	-15.730	-13.074	-10.733	-8.582	-6.558	-4.625	-2.752	-0.913
156	-15.698	-13.070	-10.745	-8.601	-6.579	-4.643	-2.764	-0.918
157	-15.668	-13.066	-10.756	-8.619	-6.599	-4.660	-2.776	-0.922
158	-15.639	-13.062	-10.767	-8.637	-6.618	-4.677	-2.787	-0.926
159	-15.611	-13.059	-10.777	-8.654	-6.636	-4.692	-2.797	-0.929
160	-15.584	-13.056	-10.787	-8.669	-6.653	-4.707	-2.807	-0.933

Table 34

FIG. 58

	Label							
	8	9	10	11	12	13	14	15
Design #								
121	0.772	2.339	3.966	5.720	7.676	10.041	13.092	17.156
122	0.774	2.344	3.975	5.734	7.696	10.068	13.104	17.115
123	0.776	2.349	3.986	5.748	7.718	10.095	13.114	17.074
124	0.780	2.350	4.000	5.760	7.740	10.120	13.120	17.030
125	0.778	2.355	3.997	5.762	7.741	10.122	13.124	17.031
126	0.780	2.362	4.008	5.778	7.765	10.150	13.132	16.988
127	0.783	2.368	4.020	5.795	7.791	10.177	13.140	16.944
128	0.785	2.376	4.032	5.814	7.817	10.205	13.147	16.900
129	0.788	2.383	4.046	5.833	7.845	10.232	13.152	16.854
130	0.790	2.392	4.060	5.855	7.875	10.259	13.157	16.809
131	0.793	2.401	4.075	5.877	7.905	10.286	13.161	16.762
132	0.796	2.410	4.091	5.901	7.936	10.313	13.163	16.715
133	0.800	2.420	4.109	5.927	7.967	10.339	13.165	16.667
134	0.803	2.431	4.128	5.955	8.000	10.365	13.166	16.619
135	0.807	2.443	4.148	5.983	8.033	10.390	13.165	16.570
136	0.811	2.456	4.170	6.014	8.066	10.415	13.164	16.521
137	0.816	2.470	4.193	6.045	8.100	10.439	13.162	16.471
138	0.821	2.484	4.217	6.077	8.134	10.462	13.159	16.422
139	0.826	2.500	4.243	6.111	8.167	10.484	13.155	16.372
140	0.832	2.517	4.270	6.144	8.201	10.506	13.151	16.323
141	0.838	2.534	4.297	6.179	8.234	10.527	13.146	16.273
142	0.844	2.552	4.326	6.213	8.266	10.547	13.140	16.225
143	0.850	2.560	4.340	6.230	8.290	10.560	13.140	16.190
144	0.850	2.571	4.354	6.247	8.298	10.566	13.134	16.176
145	0.857	2.589	4.383	6.281	8.329	10.585	13.128	16.129
146	0.863	2.608	4.411	6.313	8.359	10.603	13.122	16.083
147	0.870	2.627	4.439	6.345	8.388	10.620	13.116	16.038
148	0.876	2.645	4.466	6.376	8.416	10.636	13.110	15.994
149	0.882	2.662	4.492	6.406	8.443	10.652	13.104	15.952
150	0.888	2.679	4.517	6.435	8.469	10.667	13.098	15.911
151	0.894	2.695	4.541	6.462	8.494	10.681	13.093	15.872
152	0.899	2.710	4.564	6.488	8.517	10.695	13.087	15.834
153	0.904	2.725	4.585	6.513	8.540	10.708	13.083	15.798
154	0.909	2.739	4.606	6.536	8.561	10.721	13.078	15.763
155	0.913	2.752	4.625	6.558	8.582	10.733	13.074	15.730
156	0.918	2.764	4.643	6.579	8.601	10.745	13.070	15.698
157	0.922	2.776	4.660	6.599	8.619	10.756	13.066	15.668
158	0.926	2.787	4.677	6.618	8.637	10.767	13.062	15.639
159	0.929	2.797	4.692	6.636	8.654	10.777	13.059	15.611
160	0.933	2.807	4.707	6.653	8.669	10.787	13.056	15.584

Table 35

FIG. 59

	Label							
	0	1	2	3	4	5	6	7
Design #								
161	-15.559	-13.053	-10.796	-8.684	-6.670	-4.721	-2.816	-0.936
162	-15.534	-13.050	-10.805	-8.699	-6.685	-4.734	-2.825	-0.939
163	-15.512	-13.047	-10.813	-8.712	-6.699	-4.747	-2.833	-0.942
164	-15.489	-13.045	-10.822	-8.726	-6.714	-4.758	-2.841	-0.945
165	-15.468	-13.042	-10.829	-8.738	-6.727	-4.770	-2.848	-0.947
166	-15.447	-13.040	-10.837	-8.750	-6.739	-4.781	-2.856	-0.950
167	-15.428	-13.038	-10.844	-8.761	-6.751	-4.791	-2.862	-0.952
168	-15.409	-13.036	-10.851	-8.772	-6.763	-4.801	-2.869	-0.954
169	-15.392	-13.035	-10.857	-8.782	-6.773	-4.809	-2.874	-0.956
170	-15.374	-13.033	-10.864	-8.792	-6.784	-4.818	-2.880	-0.958
171	-15.359	-13.032	-10.870	-8.801	-6.793	-4.826	-2.886	-0.960
172	-15.344	-13.030	-10.875	-8.810	-6.802	-4.834	-2.891	-0.962
173	-15.328	-13.028	-10.881	-8.819	-6.812	-4.842	-2.896	-0.964
174	-15.312	-13.027	-10.887	-8.827	-6.821	-4.850	-2.901	-0.966
175	-15.300	-13.025	-10.891	-8.835	-6.829	-4.856	-2.906	-0.967
176	-15.287	-13.024	-10.896	-8.842	-6.836	-4.862	-2.910	-0.969
177	-15.275	-13.023	-10.900	-8.849	-6.843	-4.868	-2.913	-0.970
178	-15.261	-13.022	-10.905	-8.856	-6.851	-4.875	-2.918	-0.971
179	-15.252	-13.022	-10.909	-8.861	-6.856	-4.879	-2.921	-0.973
180	-15.240	-13.020	-10.913	-8.869	-6.865	-4.887	-2.926	-0.974

Table 36

FIG. 60

	Label							
	8	9	10	11	12	13	14	15
Design #								
161	0.936	2.816	4.721	6.670	8.684	10.796	13.053	15.559
162	0.939	2.825	4.734	6.685	8.699	10.805	13.050	15.534
163	0.942	2.833	4.747	6.699	8.712	10.813	13.047	15.512
164	0.945	2.841	4.758	6.714	8.726	10.822	13.045	15.489
165	0.947	2.848	4.770	6.727	8.738	10.829	13.042	15.468
166	0.950	2.856	4.781	6.739	8.750	10.837	13.040	15.447
167	0.952	2.862	4.791	6.751	8.761	10.844	13.038	15.428
168	0.954	2.869	4.801	6.763	8.772	10.851	13.036	15.409
169	0.956	2.874	4.809	6.773	8.782	10.857	13.035	15.392
170	0.958	2.880	4.818	6.784	8.792	10.864	13.033	15.374
171	0.960	2.886	4.826	6.793	8.801	10.870	13.032	15.359
172	0.962	2.891	4.834	6.802	8.810	10.875	13.030	15.344
173	0.964	2.896	4.842	6.812	8.819	10.881	13.028	15.328
174	0.966	2.901	4.850	6.821	8.827	10.887	13.027	15.312
175	0.967	2.906	4.856	6.829	8.835	10.891	13.025	15.300
176	0.969	2.909	4.862	6.836	8.842	10.896	13.024	15.287
177	0.970	2.913	4.868	6.843	8.849	10.900	13.023	15.275
178	0.971	2.918	4.875	6.851	8.856	10.905	13.022	15.261
179	0.973	2.921	4.879	6.856	8.861	10.909	13.022	15.252
180	0.974	2.926	4.887	6.865	8.869	10.913	13.019	15.240

Table 37

FIG. 61

Design #	SNRs	5.00%	15.00%	30.00%	45.00%	60.00%	100.00%
1	-5	0.27	0.23	0.2	0.17	0.14	0
2	-4.8	0.31	0.26	0.22	0.19	0.16	0
3	-4.6	0.38	0.32	0.27	0.23	0.18	0
4	-4.4	0.34	0.29	0.25	0.21	0.16	0
5	-4.2	0.34	0.29	0.25	0.21	0.18	0
6	-4	0.38	0.32	0.27	0.23	0.2	0
7	-3.8	0.38	0.32	0.27	0.23	0.2	0
8	-3.6	0.42	0.36	0.3	0.26	0.22	0
9	-3.4	0.38	0.32	0.27	0.23	0.2	0
10	-3.2	0.47	0.4	0.34	0.29	0.24	0
11	-3	0.52	0.4	0.34	0.26	0.22	0
12	-2.8	0.52	0.44	0.38	0.32	0.27	0
13	-2.6	0.47	0.4	0.34	0.29	0.24	0
14	-2.4	0.52	0.44	0.38	0.32	0.27	0
15	-2.2	0.58	0.49	0.42	0.36	0.3	0
16	-2	0.58	0.49	0.42	0.36	0.27	0
17	-1.8	0.65	0.55	0.47	0.4	0.34	0
18	-1.6	0.65	0.55	0.47	0.4	0.34	0
19	-1.4	0.72	0.61	0.52	0.44	0.37	0
20	-1.2	0.65	0.55	0.47	0.4	0.34	0
21	-1	0.71	0.61	0.52	0.44	0.37	0
22	-0.8	0.8	0.68	0.58	0.49	0.42	0
23	-0.6	0.74	0.63	0.53	0.45	0.38	0
24	-0.4	0.83	0.7	0.6	0.51	0.43	0
25	-0.2	0.93	0.79	0.67	0.57	0.44	0
26	0	0.93	0.79	0.67	0.57	0.49	0
27	0	0.93	0.79	0.67	0.57	0.44	0
28	0.2	1.04	0.89	0.75	0.64	0.49	0
29	0.4	0.97	0.82	0.7	0.59	0.45	0
30	0.6	0.97	0.82	0.7	0.59	0.5	0
31	0.8	0.97	0.82	0.7	0.6	0.51	0
32	1	0.97	0.83	0.7	0.6	0.51	0
33	1.2	0.98	0.83	0.71	0.6	0.51	0
34	1.4	1.09	0.92	0.79	0.67	0.57	0
35	1.6	1.09	0.93	0.79	0.67	0.57	0
36	1.8	1.22	1.04	0.88	0.75	0.64	0
37	2	1.23	1.04	0.89	0.75	0.64	0
38	2.2	1.23	1.05	0.89	0.76	0.64	0
39	2.4	1.26	1.07	0.91	0.77	0.66	0

Table 38

FIG. 62

Design #	SNRs	5.00%	15.00%	30.00%	45.00%	60.00%	100.00%
40	2.6	1.25	1.06	0.9	0.77	0.65	0
41	2.8	1.25	1.06	0.9	0.77	0.65	0
42	3	1.38	1.18	1	0.85	0.65	0
43	3.2	1.38	1.18	1	0.85	0.65	0
44	3.4	1.38	1.18	1	0.85	0.72	0
45	3.6	1.34	1.14	0.97	0.83	0.7	0
46	3.8	1.2	1.02	0.87	0.74	0.63	0
47	4	1.46	1.24	1.05	0.9	0.69	0
48	4.2	1.42	1.21	1.03	0.87	0.74	0
49	4.4	1.52	1.29	1.1	0.93	0.71	0
50	4.6	1.44	1.23	1.04	0.89	0.68	0
51	4.79	1.22	1.04	0.88	0.75	0.64	0
52	4.8	1.2	1.02	0.87	0.74	0.63	0
53	5	0.98	0.83	0.71	0.6	0.51	0
54	5.2	0.6	0.51	0.43	0.37	0.31	0
55	5.4	0.38	0.33	0.28	0.24	0.2	0
56	5.6	0.37	0.32	0.27	0.23	0.19	0
57	5.8	1.09	0.93	0.79	0.67	0.57	0
58	6	1.45	1.23	1.05	0.89	0.76	0
59	6.2	1.46	1.24	1.06	0.9	0.69	0
60	6.4	1.4	1.19	1.01	0.86	0.73	0
61	6.6	1.41	1.2	1.02	0.86	0.74	0
62	6.8	1.42	1.2	1.02	0.87	0.67	0
63	7	1.42	1.21	1.02	0.87	0.67	0
64	7.2	1.42	1.21	1.03	0.87	0.67	0
65	7.4	1.28	1.09	0.92	0.79	0.67	0
66	7.6	1.42	1.21	1.02	0.87	0.67	0
67	7.8	1.29	1.1	0.93	0.79	0.67	0
68	8	1.3	1.11	0.94	0.8	0.68	0
69	8.2	1.31	1.11	0.95	0.8	0.68	0
70	8.4	1.32	1.12	0.95	0.81	0.69	0
71	8.52	1.32	1.12	0.95	0.81	0.62	0
72	8.6	1.32	1.13	0.96	0.81	0.69	0
73	8.8	1.29	1.09	0.93	0.79	0.67	0
74	9	1.35	1.15	0.97	0.83	0.7	0
75	9.2	1.38	1.17	0.99	0.85	0.65	0
76	9.4	1.24	1.05	0.89	0.76	0.65	0
77	9.6	1.24	1.06	0.89	0.76	0.65	0
78	9.8	1.25	1.06	0.89	0.76	0.64	0
79	10	1.25	1.06	0.89	0.76	0.64	0
80	10.2	1.18	1	0.85	0.72	0.61	0

Table 39

FIG. 63

Design #	SNRs	5.00%	15.00%	30.00%	45.00%	60.00%	100.00%
81	10.4	1.2	1.02	0.86	0.73	0.62	0
82	10.6	1.2	1.02	0.87	0.74	0.63	0
83	10.8	1.19	1.01	0.86	0.73	0.56	0
84	11	1.08	0.92	0.6	0.51	0.43	0
85	11.2	0.92	0.78	0.44	0.37	0.32	0
86	11.4	0.82	0.7	0.36	0.31	0.26	0
87	11.6	0.78	0.67	0.37	0.31	0.27	0
88	11.8	0.79	0.67	0.38	0.33	0.28	0
89	11.94	0.79	0.67	0.4	0.34	0.29	0
90	12	0.79	0.67	0.39	0.33	0.28	0
91	12.2	0.8	0.68	0.41	0.35	0.3	0
92	12.4	0.8	0.68	0.58	0.49	0.42	0
93	12.6	0.81	0.68	0.58	0.49	0.42	0
94	12.8	0.68	0.58	0.49	0.42	0.36	0
95	13	0.66	0.56	0.48	0.41	0.35	0
96	13.2	0.67	0.57	0.48	0.41	0.35	0
97	13.4	0.61	0.52	0.44	0.38	0.32	0
98	13.6	0.61	0.52	0.44	0.38	0.32	0
99	13.8	0.22	0.18	0.16	0.13	0.11	0
100	14	0.06	0.05	0.05	0.04	0.03	0
101	14.2	0.09	0.07	0.06	0.05	0.04	0
102	14.4	0.13	0.11	0.09	0.08	0.07	0
103	14.6	0.14	0.12	0.1	0.08	0.07	0
104	14.8	0.15	0.13	0.11	0.09	0.08	0
105	15	0.17	0.14	0.12	0.1	0.09	0
106	15.2	0.19	0.16	0.14	0.12	0.1	0
107	15.25	0.19	0.17	0.14	0.12	0.1	0
108	15.4	0.21	0.18	0.15	0.13	0.11	0
109	15.6	0.23	0.2	0.17	0.14	0.12	0
110	15.8	0.25	0.21	0.18	0.15	0.13	0
111	16	0.27	0.23	0.2	0.17	0.14	0
112	16.2	0.29	0.25	0.21	0.18	0.15	0
113	16.4	0.31	0.26	0.22	0.19	0.16	0
114	16.6	0.33	0.28	0.24	0.2	0.17	0
115	16.8	0.35	0.3	0.25	0.22	0.18	0
116	17	0.37	0.32	0.27	0.23	0.19	0
117	17.2	0.39	0.33	0.28	0.24	0.21	0
118	17.4	0.41	0.35	0.3	0.25	0.22	0
119	17.6	0.43	0.37	0.31	0.27	0.23	0
120	17.8	0.45	0.39	0.33	0.28	0.24	0

Table 40

FIG. 64

Design #	SNRs	5.00%	15.00%	30.00%	45.00%	60.00%	100.00%
121	18	0.47	0.4	0.34	0.29	0.25	0
122	18.2	0.49	0.42	0.35	0.3	0.25	0
123	18.4	0.46	0.39	0.33	0.28	0.24	0
124	18.59	0.48	0.41	0.31	0.27	0.23	0
125	18.6	0.48	0.41	0.31	0.27	0.23	0
126	18.8	0.45	0.38	0.3	0.25	0.21	0
127	19	0.46	0.39	0.28	0.24	0.21	0
128	19.2	0.43	0.37	0.28	0.24	0.21	0
129	19.4	0.4	0.34	0.28	0.24	0.2	0
130	19.6	0.41	0.35	0.28	0.24	0.2	0
131	19.8	0.35	0.3	0.25	0.22	0.18	0
132	20	0.33	0.28	0.24	0.2	0.17	0
133	20.2	0.34	0.29	0.25	0.21	0.18	0
134	20.4	0.32	0.27	0.23	0.2	0.17	0
135	20.6	0.3	0.26	0.22	0.18	0.16	0
136	20.8	0.31	0.26	0.22	0.19	0.15	0
137	21	0.26	0.22	0.19	0.16	0.14	0
138	21.2	0.27	0.23	0.19	0.17	0.14	0
139	21.4	0.25	0.21	0.18	0.15	0.13	0
140	21.6	0.24	0.2	0.17	0.15	0.11	0
141	21.8	0.21	0.18	0.15	0.13	0.11	0
142	22	0.2	0.17	0.14	0.12	0.1	0
143	22.12	0.22	0.18	0.16	0.13	0.1	0
144	22.2	0.19	0.16	0.14	0.12	0.1	0
145	22.4	0.18	0.16	0.13	0.11	0.1	0
146	22.6	0.18	0.15	0.13	0.11	0.09	0
147	22.8	0.17	0.14	0.12	0.1	0.09	0
148	23	0.14	0.12	0.1	0.09	0.08	0
149	23.2	0.15	0.13	0.11	0.09	0.07	0
150	23.4	0.13	0.11	0.09	0.08	0.07	0
151	23.6	0.14	0.12	0.1	0.09	0.07	0
152	23.8	0.13	0.11	0.1	0.08	0.07	0
153	24	0.13	0.11	0.09	0.08	0.06	0
154	24.2	0.11	0.09	0.08	0.07	0.06	0
155	24.4	0.1	0.09	0.08	0.06	0.05	0
156	24.6	0.1	0.08	0.07	0.06	0.05	0
157	24.8	0.09	0.08	0.07	0.06	0.05	0
158	25	0.09	0.08	0.07	0.06	0.05	0
159	25.2	0.09	0.07	0.06	0.05	0.05	0
160	25.4	0.08	0.07	0.06	0.05	0.04	0

Table 41

FIG. 65

Design #	SNRs	5.00%	15.00%	30.00%	45.00%	60.00%	100.00%
161	25.6	0.08	0.07	0.06	0.05	0.04	0
162	25.8	0.08	0.06	0.05	0.05	0.04	0
163	26	0.07	0.06	0.05	0.04	0.04	0
164	26.2	0.07	0.06	0.05	0.04	0.04	0
165	26.4	0.07	0.06	0.05	0.04	0.03	0
166	26.6	0.06	0.05	0.05	0.04	0.03	0
167	26.8	0.05	0.05	0.04	0.03	0.03	0
168	27	0.06	0.05	0.04	0.04	0.03	0
169	27.2	0.06	0.05	0.04	0.03	0.03	0
170	27.4	0.05	0.04	0.04	0.03	0.03	0
171	27.6	0.05	0.04	0.04	0.03	0.03	0
172	27.8	0.05	0.04	0.03	0.03	0.02	0
173	28	0.04	0.04	0.03	0.03	0.02	0
174	28.2	0.04	0.04	0.03	0.03	0.02	0
175	28.4	0.04	0.04	0.03	0.03	0.02	0
176	28.6	0.04	0.03	0.03	0.02	0.02	0
177	28.8	0.03	0.03	0.03	0.02	0.02	0
178	29	0.04	0.03	0.03	0.02	0.02	0
179	29.2	0.04	0.03	0.03	0.02	0.02	0
180	29.4	0.03	0.03	0.02	0.02	0.02	0

Table 42

FIG. 66

	SNR	Opt. Cap	Std. Cap	Gain [bits]	Gain %
Design #					
1	-5.0000	0.1977	0.1576	0.0401	25.4629
2	-4.8000	0.2058	0.1643	0.0415	25.2261
3	-4.6000	0.2141	0.1713	0.0428	24.9841
4	-4.4000	0.2227	0.1785	0.0442	24.7360
5	-4.2000	0.2316	0.1860	0.0455	24.4818
6	-4.0000	0.2407	0.1938	0.0469	24.2216
7	-3.8000	0.2502	0.2019	0.0484	23.9548
8	-3.6000	0.2600	0.2102	0.0498	23.6816
9	-3.4000	0.2700	0.2188	0.0512	23.4016
10	-3.2000	0.2804	0.2277	0.0526	23.1144
11	-3.0000	0.2910	0.2370	0.0541	22.8200
12	-2.8000	0.3020	0.2465	0.0555	22.5180
13	-2.6000	0.3133	0.2563	0.0569	22.2080
14	-2.4000	0.3248	0.2665	0.0583	21.8898
15	-2.2000	0.3367	0.2770	0.0597	21.5628
16	-2.0000	0.3489	0.2878	0.0611	21.2267
17	-1.8000	0.3613	0.2989	0.0624	20.8808
18	-1.6000	0.3741	0.3104	0.0637	20.5252
19	-1.4000	0.3872	0.3222	0.0650	20.1587
20	-1.2000	0.4005	0.3344	0.0661	19.7810
21	-1.0000	0.4141	0.3469	0.0673	19.3912
22	-0.8000	0.4280	0.3597	0.0683	18.9893
23	-0.6000	0.4421	0.3729	0.0693	18.5739
24	-0.4000	0.4565	0.3864	0.0701	18.1444
25	-0.2000	0.4711	0.4003	0.0708	17.7001
26	0.0000	0.4859	0.4145	0.0715	17.2401
27	0.2000	0.5010	0.4291	0.0719	16.7635
28	0.4000	0.5162	0.4440	0.0722	16.2693
29	0.6000	0.5316	0.4592	0.0724	15.7567
30	0.8000	0.5471	0.4748	0.0723	15.2244
31	1.0000	0.5628	0.4908	0.0720	14.6717
32	1.2000	0.5786	0.5071	0.0715	14.0974
33	1.4000	0.5944	0.5237	0.0707	13.5004
34	1.6000	0.6104	0.5407	0.0698	12.9055
35	1.8000	0.6270	0.5580	0.0691	12.3775
36	2.0000	0.6442	0.5756	0.0686	11.9162
37	2.2000	0.6619	0.5936	0.0684	11.5177
38	2.4000	0.6802	0.6118	0.0684	11.1782
39	2.6000	0.6991	0.6305	0.0687	10.8936
40	2.8000	0.7186	0.6494	0.0692	10.6597

Table 43

FIG. 67

	SNR	Opt. Cap	Std. Cap	Gain [bits]	Gain %
Design #					
41	3.0000	0.7386	0.6686	0.0700	10.4722
42	3.2000	0.7593	0.6882	0.0711	10.3265
43	3.4000	0.7804	0.7081	0.0724	10.2182
44	3.6000	0.8021	0.7282	0.0739	10.1425
45	3.8000	0.8243	0.7487	0.0756	10.0945
46	4.0000	0.8470	0.7695	0.0775	10.0696
47	4.2000	0.8702	0.7906	0.0796	10.0628
48	4.4000	0.8938	0.8120	0.0818	10.0689
49	4.6000	0.9178	0.8337	0.0841	10.0835
50	4.8000	0.9421	0.8557	0.0864	10.1016
51	5.0000	0.9668	0.8780	0.0888	10.1186
52	5.2000	0.9917	0.9005	0.0912	10.1305
53	5.4000	1.0169	0.9234	0.0936	10.1329
54	5.6000	1.0423	0.9465	0.0958	10.1224
55	5.8000	1.0678	0.9699	0.0979	10.0957
56	6.0000	1.0934	0.9936	0.0999	10.0497
57	6.2000	1.1191	1.0175	0.1016	9.9824
58	6.4000	1.1448	1.0417	0.1030	9.8921
59	6.6000	1.1704	1.0662	0.1042	9.7773
60	6.8000	1.1960	1.0909	0.1051	9.6380
61	7.0000	1.2216	1.1159	0.1057	9.4739
62	7.2000	1.2470	1.1411	0.1060	9.2859
63	7.4000	1.2725	1.1665	0.1060	9.0866
64	7.6000	1.2988	1.1922	0.1067	8.9466
65	7.8000	1.3259	1.2180	0.1079	8.8548
66	8.0000	1.3535	1.2441	0.1094	8.7928
67	8.2000	1.3814	1.2704	0.1110	8.7338
68	8.4000	1.4094	1.2969	0.1125	8.6745
69	8.6000	1.4376	1.3236	0.1140	8.6134
70	8.8000	1.4696	1.3505	0.1191	8.8172
71	9.0000	1.4999	1.3776	0.1223	8.8779
72	9.0008	1.5000	1.3777	0.1223	8.8771
73	9.2000	1.5300	1.4048	0.1252	8.9121
74	9.4000	1.5600	1.4323	0.1278	8.9202
75	9.6000	1.5899	1.4599	0.1300	8.9029
76	9.8000	1.6195	1.4877	0.1318	8.8608
77	10.0000	1.6490	1.5157	0.1333	8.7947
78	10.2000	1.6784	1.5439	0.1345	8.7124
79	10.4000	1.7079	1.5722	0.1357	8.6296
80	10.6000	1.7376	1.6008	0.1368	8.5474

Table 44

FIG. 68

	SNR	Opt. Cap	Std. Cap	Gain [bits]	Gain %
Design #					
81	10.8000	1.7719	1.6296	0.1424	8.7355
82	11.0000	1.8033	1.6586	0.1447	8.7246
83	11.2000	1.8346	1.6877	0.1468	8.6985
84	11.4000	1.8659	1.7172	0.1487	8.6597
85	11.6000	1.8972	1.7468	0.1504	8.6109
86	11.8000	1.9287	1.7767	0.1520	8.5555
87	12.0000	1.9603	1.8068	0.1535	8.4959
88	12.2000	1.9920	1.8371	0.1549	8.4335
89	12.2496	2.0000	1.8447	0.1553	8.4187
90	12.4000	2.0240	1.8677	0.1563	8.3688
91	12.6000	2.0561	1.8985	0.1576	8.2996
92	12.8000	2.0883	1.9296	0.1587	8.2232
93	13.0000	2.1205	1.9609	0.1596	8.1376
94	13.2000	2.1527	1.9925	0.1602	8.0402
95	13.4000	2.1848	2.0242	0.1605	7.9297
96	13.6000	2.2167	2.0563	0.1605	7.8050
97	13.8000	2.2486	2.0885	0.1601	7.6656
98	14.0000	2.2803	2.1209	0.1593	7.5115
99	14.2000	2.3117	2.1536	0.1581	7.3434
100	14.4000	2.3430	2.1864	0.1566	7.1620
101	14.6000	2.3741	2.2194	0.1547	6.9689
102	14.8000	2.4050	2.2526	0.1524	6.7660
103	15.0000	2.4358	2.2859	0.1499	6.5558
104	15.2000	2.4664	2.3194	0.1471	6.3410
105	15.4000	2.4971	2.3529	0.1441	6.1245
106	15.4192	2.5000	2.3562	0.1438	6.1030
107	15.6000	2.5276	2.3866	0.1410	5.9087
108	15.8000	2.5582	2.4204	0.1379	5.6954
109	16.0000	2.5888	2.4542	0.1346	5.4854
110	16.2000	2.6194	2.4881	0.1313	5.2791
111	16.4000	2.6500	2.5220	0.1280	5.0762
112	16.6000	2.6806	2.5560	0.1246	4.8762
113	16.8000	2.7111	2.5899	0.1212	4.6790
114	17.0000	2.7415	2.6238	0.1177	4.4842
115	17.2000	2.7718	2.6577	0.1141	4.2915
116	17.4000	2.8020	2.6916	0.1104	4.1009
117	17.6000	2.8321	2.7254	0.1066	3.9130
118	17.8000	2.8620	2.7591	0.1029	3.7285
119	18.0000	2.8919	2.7928	0.0991	3.5488
120	18.2000	2.9218	2.8263	0.0954	3.3762

Table 45

FIG. 69

	SNR	Opt. Cap	Std. Cap	Gain [bits]	Gain %
Design #					
121	18.4000	2.9517	2.8598	0.0919	3.2131
122	18.6000	2.9817	2.8931	0.0886	3.0622
123	18.7214	3.0000	2.9133	0.0867	2.9760
124	18.8000	3.0119	2.9263	0.0856	2.9259
125	19.0000	3.0423	2.9593	0.0830	2.8046
126	19.2000	3.0729	2.9922	0.0807	2.6964
127	19.4000	3.1035	3.0249	0.0786	2.5978
128	19.6000	3.1341	3.0575	0.0766	2.5058
129	19.8000	3.1646	3.0899	0.0747	2.4178
130	20.0000	3.1949	3.1221	0.0728	2.3321
131	20.2000	3.2250	3.1541	0.0709	2.2472
132	20.4000	3.2548	3.1859	0.0689	2.1625
133	20.6000	3.2844	3.2176	0.0668	2.0772
134	20.8000	3.3137	3.2490	0.0647	1.9911
135	21.0000	3.3427	3.2802	0.0625	1.9039
136	21.2000	3.3714	3.3112	0.0601	1.8158
137	21.4000	3.3997	3.3420	0.0577	1.7270
138	21.6000	3.4276	3.3724	0.0552	1.6377
139	21.8000	3.4553	3.4026	0.0527	1.5483
140	22.0000	3.4825	3.4324	0.0501	1.4593
141	22.1304	3.5000	3.4516	0.0484	1.4022
142	22.2000	3.5093	3.4618	0.0475	1.3712
143	22.4000	3.5357	3.4909	0.0448	1.2844
144	22.6000	3.5616	3.5194	0.0422	1.1994
145	22.8000	3.5871	3.5475	0.0396	1.1167
146	23.0000	3.6120	3.5750	0.0371	1.0366
147	23.2000	3.6364	3.6019	0.0346	0.9594
148	23.4000	3.6602	3.6281	0.0321	0.8854
149	23.6000	3.6834	3.6536	0.0298	0.8148
150	23.8000	3.7059	3.6784	0.0275	0.7476
151	24.0000	3.7277	3.7023	0.0253	0.6839
152	24.2000	3.7487	3.7254	0.0232	0.6237
153	24.4000	3.7689	3.7476	0.0213	0.5670
154	24.6000	3.7882	3.7688	0.0194	0.5139
155	24.8000	3.8067	3.7891	0.0176	0.4641
156	25.0000	3.8242	3.8083	0.0159	0.4176
157	25.2000	3.8409	3.8266	0.0143	0.3744
158	25.4000	3.8566	3.8437	0.0129	0.3344
159	25.6000	3.8713	3.8598	0.0115	0.2974
160	25.8000	3.8851	3.8749	0.0102	0.2634

Table 46

FIG. 70

	SNR	Opt. Cap	Std. Cap	Gain [bits]	Gain %
Design #					
161	26.0000	3.8979	3.8889	0.0090	0.2323
162	26.2000	3.9097	3.9018	0.0079	0.2037
163	26.4000	3.9207	3.9137	0.0070	0.1779
164	26.6000	3.9306	3.9246	0.0061	0.1545
165	26.8000	3.9397	3.9345	0.0052	0.1334
166	27.0000	3.9479	3.9434	0.0045	0.1145
167	27.2000	3.9553	3.9515	0.0039	0.0977
168	27.4000	3.9619	3.9587	0.0033	0.0829
169	27.6000	3.9678	3.9650	0.0028	0.0698
170	27.8000	3.9729	3.9706	0.0023	0.0584
171	28.0000	3.9775	3.9755	0.0019	0.0485
172	28.2000	3.9814	3.9798	0.0016	0.0399
173	28.4000	3.9847	3.9834	0.0013	0.0326
174	28.6000	3.9876	3.9865	0.0011	0.0264
175	28.8000	3.9900	3.9892	0.0008	0.0212
176	29.0000	3.9920	3.9914	0.0007	0.0169
177	29.2000	3.9937	3.9932	0.0005	0.0134
178	29.4000	3.9951	3.9947	0.0004	0.0103

Table 47

FIG. 71

	Label							
	0	1	2	3	4	5	6	7
Design #								
1	-9.221	-9.221	-9.221	-9.221	-9.216	-9.216	-9.221	-9.221
2	-9.253	-9.252	-9.200	-9.252	-9.200	-9.200	-9.200	-9.200
3	-9.232	-9.222	-9.216	-9.222	-9.216	-9.216	-9.216	-9.216
4	-9.224	-9.220	-9.219	-9.219	-9.219	-9.219	-9.219	-9.219
5	-9.226	-9.226	-9.226	-9.226	-9.195	-9.219	-9.220	-9.220
6	-9.230	-9.225	-9.218	-9.218	-9.217	-9.217	-9.217	-9.217
7	-9.229	-9.224	-9.224	-9.224	-9.214	-9.214	-9.214	-9.214
8	-9.225	-9.225	-9.225	-9.225	-9.192	-9.219	-9.225	-9.219
9	-9.225	-9.224	-9.219	-9.219	-9.215	-9.218	-9.219	-9.218
10	-9.227	-9.227	-9.227	-9.227	-9.193	-9.200	-9.227	-9.227
11	-9.221	-9.221	-9.221	-9.221	-9.214	-9.218	-9.221	-9.220
12	-9.220	-9.220	-9.220	-9.220	-9.217	-9.217	-9.220	-9.220
13	-9.228	-9.228	-9.215	-9.228	-9.215	-9.215	-9.215	-9.215
14	-9.221	-9.221	-9.221	-9.221	-9.216	-9.216	-9.221	-9.220
15	-9.220	-9.220	-9.220	-9.220	-9.219	-9.219	-9.219	-9.219
16	-9.220	-9.220	-9.220	-9.220	-9.219	-9.219	-9.219	-9.219
17	-9.232	-9.232	-9.232	-9.232	-9.189	-9.189	-9.231	-9.219
18	-9.224	-9.224	-9.224	-9.224	-9.211	-9.212	-9.224	-9.212
19	-9.222	-9.220	-9.220	-9.220	-9.219	-9.219	-9.220	-9.219
20	-9.223	-9.220	-9.219	-9.220	-9.217	-9.219	-9.219	-9.219
21	-9.220	-9.220	-9.220	-9.220	-9.219	-9.219	-9.220	-9.220
22	-9.222	-9.222	-9.220	-9.220	-9.218	-9.219	-9.219	-9.219
23	-9.229	-9.223	-9.219	-9.219	-9.217	-9.217	-9.217	-9.217
24	-9.225	-9.219	-9.219	-9.219	-9.219	-9.219	-9.219	-9.219
25	-9.224	-9.222	-9.220	-9.221	-9.217	-9.217	-9.217	-9.217
26	-9.223	-9.223	-9.223	-9.223	-9.210	-9.212	-9.222	-9.222
27	-9.222	-9.221	-9.221	-9.221	-9.217	-9.217	-9.220	-9.218
28	-9.235	-9.235	-9.230	-9.235	-9.203	-9.206	-9.207	-9.207
29	-9.226	-9.220	-9.219	-9.219	-9.218	-9.218	-9.218	-9.218
30	-9.236	-9.236	-9.211	-9.235	-9.207	-9.210	-9.210	-9.210
31	-9.225	-9.225	-9.216	-9.225	-9.216	-9.216	-9.216	-9.216
32	-9.226	-9.226	-9.224	-9.225	-9.214	-9.214	-9.214	-9.214
33	-9.221	-9.221	-9.220	-9.220	-9.219	-9.219	-9.219	-9.219
34	-10.280	-10.279	-10.279	-10.279	-8.021	-8.021	-8.021	-8.021
35	-10.773	-10.773	-10.772	-10.772	-7.346	-7.346	-7.346	-7.346
36	-11.094	-11.094	-11.094	-11.094	-6.850	-6.850	-6.850	-6.850
37	-11.336	-11.336	-11.336	-11.336	-6.442	-6.442	-6.442	-6.442
38	-11.527	-11.527	-11.527	-11.527	-6.094	-6.094	-6.094	-6.094
39	-11.684	-11.684	-11.684	-11.684	-5.786	-5.786	-5.786	-5.786
40	-11.817	-11.816	-11.816	-11.816	-5.512	-5.512	-5.512	-5.512

Table 48

FIG. 72

	Label							
	8	9	10	11	12	13	14	15
Design #								
1	9.220	9.220	9.220	9.220	9.220	9.220	9.220	9.220
2	9.220	9.220	9.220	9.220	9.218	9.218	9.220	9.220
3	9.232	9.233	9.232	9.232	9.205	9.205	9.210	9.207
4	9.223	9.223	9.223	9.223	9.193	9.223	9.223	9.223
5	9.226	9.219	9.219	9.219	9.219	9.219	9.219	9.219
6	9.220	9.220	9.220	9.220	9.218	9.220	9.220	9.220
7	9.225	9.225	9.225	9.225	9.197	9.208	9.225	9.225
8	9.220	9.220	9.219	9.219	9.219	9.219	9.219	9.219
9	9.221	9.221	9.219	9.221	9.218	9.218	9.219	9.219
10	9.227	9.221	9.221	9.221	9.214	9.215	9.221	9.217
11	9.229	9.229	9.214	9.229	9.214	9.214	9.214	9.214
12	9.224	9.224	9.217	9.224	9.217	9.217	9.217	9.217
13	9.228	9.221	9.217	9.221	9.217	9.217	9.217	9.217
14	9.221	9.219	9.219	9.219	9.219	9.219	9.219	9.219
15	9.222	9.220	9.220	9.220	9.219	9.219	9.220	9.219
16	9.233	9.218	9.218	9.218	9.218	9.218	9.218	9.218
17	9.232	9.225	9.223	9.223	9.213	9.213	9.214	9.214
18	9.226	9.224	9.224	9.224	9.214	9.214	9.218	9.214
19	9.222	9.222	9.221	9.222	9.217	9.218	9.218	9.218
20	9.223	9.219	9.219	9.219	9.219	9.219	9.219	9.219
21	9.246	9.246	9.247	9.246	9.193	9.193	9.193	9.193
22	9.222	9.220	9.220	9.220	9.219	9.219	9.219	9.219
23	9.228	9.228	9.217	9.217	9.217	9.217	9.217	9.217
24	9.223	9.223	9.219	9.219	9.218	9.218	9.218	9.218
25	9.224	9.224	9.220	9.224	9.214	9.214	9.220	9.214
26	9.224	9.224	9.224	9.224	9.199	9.217	9.223	9.224
27	9.222	9.219	9.219	9.219	9.219	9.219	9.219	9.219
28	9.235	9.228	9.226	9.228	9.210	9.210	9.210	9.210
29	9.220	9.220	9.220	9.220	9.219	9.219	9.219	9.219
30	9.227	9.225	9.224	9.225	9.214	9.214	9.214	9.214
31	9.222	9.222	9.221	9.221	9.218	9.218	9.218	9.218
32	9.229	9.229	9.214	9.229	9.214	9.214	9.214	9.214
33	9.222	9.222	9.222	9.222	9.217	9.217	9.218	9.217
34	10.279	10.279	10.279	10.279	8.021	8.021	8.022	8.021
35	10.773	10.773	10.773	10.773	7.345	7.345	7.345	7.345
36	11.096	11.096	11.089	11.096	6.850	6.850	6.850	6.850
37	11.336	11.334	11.334	11.334	6.443	6.443	6.443	6.443
38	11.527	11.527	11.527	11.527	6.094	6.094	6.094	6.094
39	11.684	11.684	11.684	11.684	5.786	5.786	5.786	5.786
40	11.817	11.816	11.815	11.815	5.512	5.512	5.512	5.512

Table 49

FIG. 73

	Label							
	0	1	2	3	4	5	6	7
Design #								
41	-11.928	-11.928	-11.928	-11.928	-5.265	-5.265	-5.265	-5.265
42	-12.025	-12.025	-12.023	-12.025	-5.042	-5.042	-5.042	-5.042
43	-12.108	-12.108	-12.107	-12.108	-4.838	-4.838	-4.838	-4.838
44	-12.181	-12.180	-12.180	-12.180	-4.652	-4.652	-4.652	-4.652
45	-12.244	-12.244	-12.244	-12.244	-4.482	-4.482	-4.482	-4.482
46	-12.300	-12.300	-12.300	-12.300	-4.327	-4.327	-4.327	-4.327
47	-12.348	-12.348	-12.348	-12.348	-4.187	-4.187	-4.187	-4.187
48	-12.391	-12.391	-12.390	-12.390	-4.058	-4.058	-4.058	-4.058
49	-12.429	-12.429	-12.428	-12.428	-3.942	-3.942	-3.942	-3.942
50	-12.461	-12.461	-12.461	-12.461	-3.837	-3.837	-3.837	-3.837
51	-12.491	-12.490	-12.489	-12.489	-3.743	-3.743	-3.743	-3.743
52	-12.515	-12.515	-12.514	-12.514	-3.660	-3.660	-3.660	-3.660
53	-12.541	-12.541	-12.517	-12.522	-3.592	-3.592	-3.594	-3.594
54	-12.556	-12.552	-12.552	-12.552	-3.524	-3.524	-3.524	-3.524
55	-12.568	-12.568	-12.568	-12.568	-3.471	-3.471	-3.471	-3.471
56	-12.586	-12.586	-12.569	-12.582	-3.426	-3.426	-3.427	-3.426
57	-12.595	-12.595	-12.582	-12.587	-3.391	-3.391	-3.393	-3.392
58	-12.605	-12.605	-12.575	-12.602	-3.366	-3.366	-3.368	-3.366
59	-12.605	-12.605	-12.595	-12.602	-3.349	-3.349	-3.350	-3.349
60	-12.606	-12.606	-12.593	-12.605	-3.340	-3.341	-3.343	-3.342
61	-12.615	-12.605	-12.596	-12.596	-3.339	-3.340	-3.340	-3.340
62	-12.669	-12.669	-12.531	-12.538	-3.334	-3.334	-3.357	-3.356
63	-16.220	-12.525	-10.823	-10.823	-2.815	-3.060	-3.520	-3.520
64	-12.374	-12.374	-12.374	-12.374	-3.419	-3.419	-3.419	-3.419
65	-16.429	-12.067	-10.510	-10.510	-2.915	-3.151	-3.545	-3.545
66	-16.646	-11.953	-10.412	-10.412	-2.868	-3.118	-3.554	-3.554
67	-16.808	-11.873	-10.335	-10.335	-2.828	-3.086	-3.564	-3.564
68	-16.934	-11.816	-10.270	-10.270	-2.793	-3.054	-3.575	-3.575
69	-17.032	-11.780	-10.213	-10.213	-2.763	-3.021	-3.588	-3.588
70	-15.874	-15.874	-7.431	-7.431	15.874	15.874	-5.725	-5.725
71	-15.852	-15.845	-7.463	-7.464	15.852	15.845	-5.752	-5.752
72	-15.850	-15.850	-7.460	-7.460	15.850	15.850	-5.750	-5.750
73	-15.822	-15.820	-7.500	-7.500	15.822	15.822	-5.777	-5.777
74	-15.793	-15.792	-7.542	-7.542	15.794	15.791	-5.800	-5.800
75	-15.765	-15.761	-7.587	-7.588	15.765	15.759	-5.821	-5.821
76	-15.758	-15.702	-7.633	-7.648	15.757	15.703	-5.837	-5.837
77	-15.738	-15.654	-7.688	-7.710	15.738	15.654	-5.850	-5.850
78	-16.426	-14.932	-7.512	-7.920	16.426	14.932	-5.820	-5.820
79	-16.777	-14.559	-7.409	-8.036	16.778	14.559	-5.775	-5.775
80	-17.021	-14.296	-7.335	-8.129	17.021	14.296	-5.726	-5.726

Table 50

FIG. 74

	Label							
	8	9	10	11	12	13	14	15
Design #								
41	11.928	11.928	11.928	11.928	5.265	5.265	5.265	5.265
42	12.025	12.025	12.023	12.023	5.042	5.042	5.042	5.042
43	12.108	12.108	12.108	12.108	4.838	4.838	4.838	4.838
44	12.181	12.181	12.181	12.181	4.652	4.652	4.652	4.652
45	12.244	12.244	12.244	12.244	4.482	4.482	4.482	4.482
46	12.299	12.299	12.299	12.299	4.328	4.328	4.328	4.328
47	12.348	12.348	12.348	12.348	4.187	4.187	4.187	4.187
48	12.391	12.392	12.390	12.391	4.058	4.058	4.058	4.058
49	12.429	12.429	12.429	12.429	3.941	3.941	3.941	3.941
50	12.461	12.461	12.461	12.461	3.837	3.837	3.837	3.837
51	12.491	12.491	12.489	12.489	3.743	3.743	3.743	3.743
52	12.515	12.515	12.514	12.514	3.660	3.660	3.660	3.660
53	12.540	12.540	12.540	12.540	3.583	3.583	3.585	3.583
54	12.556	12.556	12.547	12.555	3.523	3.523	3.524	3.523
55	12.569	12.569	12.568	12.569	3.470	3.470	3.471	3.471
56	12.581	12.581	12.579	12.579	3.427	3.427	3.427	3.427
57	12.595	12.588	12.587	12.587	3.392	3.393	3.393	3.393
58	12.599	12.596	12.595	12.595	3.366	3.367	3.367	3.367
59	12.600	12.600	12.600	12.600	3.351	3.351	3.351	3.351
60	12.604	12.604	12.603	12.604	3.341	3.341	3.341	3.341
61	12.607	12.607	12.597	12.607	3.338	3.338	3.339	3.338
62	12.602	12.602	12.602	12.602	3.345	3.345	3.345	3.345
63	12.424	12.424	12.424	12.424	3.403	3.403	3.403	3.403
64	16.734	12.329	10.663	10.663	2.735	3.014	3.518	3.518
65	16.429	12.066	10.511	10.511	2.915	3.151	3.545	3.545
66	16.646	11.953	10.412	10.412	2.868	3.118	3.554	3.554
67	16.808	11.873	10.335	10.335	2.828	3.086	3.564	3.564
68	16.933	11.816	10.270	10.270	2.793	3.054	3.575	3.575
69	17.033	11.780	10.213	10.213	2.762	3.022	3.588	3.588
70	5.725	5.725	0.168	0.168	7.431	7.431	-0.168	-0.168
71	5.752	5.752	0.200	0.200	7.464	7.465	-0.200	-0.200
72	5.750	5.750	0.200	0.200	7.460	7.460	-0.200	-0.200
73	5.777	5.777	0.231	0.231	7.501	7.501	-0.232	-0.232
74	5.800	5.800	0.264	0.264	7.542	7.542	-0.264	-0.264
75	5.821	5.821	0.297	0.297	7.587	7.589	-0.297	-0.297
76	5.837	5.837	0.333	0.333	7.633	7.648	-0.333	-0.333
77	5.850	5.850	0.372	0.372	7.687	7.710	-0.371	-0.371
78	5.820	5.820	0.403	0.403	7.512	7.920	-0.403	-0.403
79	5.775	5.775	0.435	0.435	7.409	8.036	-0.435	-0.435
80	5.726	5.726	0.469	0.469	7.335	8.129	-0.469	-0.469

Table 51

FIG. 75

	Label							
	0	1	2	3	4	5	6	7
Design #								
81	-18.783	-12.062	18.197	-10.830	-3.578	-5.451	-3.578	-5.645
82	-18.750	-12.045	18.134	-10.833	-3.574	-5.494	-3.574	-5.700
83	-18.705	-12.026	18.079	-10.832	-3.567	-5.547	-3.567	-5.764
84	-18.646	-12.005	18.034	-10.825	-3.556	-5.611	-3.556	-5.837
85	-18.574	-11.980	17.998	-10.814	-3.540	-5.687	-3.540	-5.920
86	-18.490	-11.954	17.970	-10.798	-3.520	-5.774	-3.520	-6.011
87	-18.398	-11.926	17.948	-10.779	-3.496	-5.869	-3.496	-6.108
88	-18.302	-11.901	17.929	-10.761	-3.470	-5.966	-3.470	-6.205
89	-18.280	-11.900	17.920	-10.760	-3.460	-5.990	-3.460	-6.230
90	-18.207	-11.880	17.909	-10.744	-3.444	-6.061	-3.444	-6.299
91	-18.120	-11.867	17.886	-10.731	-3.418	-6.149	-3.418	-6.386
92	-18.040	-11.861	17.859	-10.721	-3.393	-6.227	-3.393	-6.465
93	-17.966	-11.862	17.829	-10.715	-3.371	-6.294	-3.371	-6.537
94	-17.899	-11.872	17.796	-10.711	-3.351	-6.352	-3.351	-6.600
95	-17.837	-11.888	17.761	-10.709	-3.333	-6.400	-3.333	-6.658
96	-17.780	-11.911	17.724	-10.708	-3.317	-6.440	-3.317	-6.709
97	-17.724	-11.941	17.688	-10.705	-3.304	-6.472	-3.304	-6.756
98	-17.680	-11.982	17.639	-10.701	-3.291	-6.494	-3.291	-6.798
99	-17.625	-12.022	17.609	-10.691	-3.282	-6.514	-3.281	-6.839
100	-17.580	-12.076	17.569	-10.677	-3.277	-6.522	-3.265	-6.877
101	-17.536	-12.137	17.532	-10.655	-3.274	-6.524	-3.250	-6.913
102	-17.500	-12.211	17.494	-10.623	-3.270	-6.513	-3.233	-6.947
103	-17.466	-12.295	17.462	-10.581	-3.267	-6.491	-3.214	-6.979
104	-17.441	-12.388	17.434	-10.529	-3.263	-6.456	-3.192	-7.006
105	-17.421	-12.484	17.414	-10.470	-3.259	-6.413	-3.168	-7.028
106	-17.420	-12.490	17.410	-10.460	-3.260	-6.410	-3.170	-7.030
107	-17.407	-12.577	17.398	-10.411	-3.255	-6.363	-3.142	-7.046
108	-17.395	-12.663	17.388	-10.354	-3.252	-6.313	-3.115	-7.061
109	-17.385	-12.740	17.378	-10.304	-3.251	-6.266	-3.089	-7.074
110	-17.374	-12.807	17.370	-10.261	-3.252	-6.224	-3.063	-7.087
111	-17.363	-12.865	17.359	-10.225	-3.256	-6.186	-3.039	-7.101
112	-17.346	-12.915	17.346	-10.197	-3.264	-6.156	-3.017	-7.119
113	-17.335	-12.960	17.333	-10.172	-3.273	-6.124	-2.993	-7.137
114	-17.317	-12.998	17.316	-10.153	-3.287	-6.098	-2.970	-7.162
115	-17.296	-13.031	17.295	-10.140	-3.305	-6.074	-2.945	-7.193
116	-17.272	-13.058	17.272	-10.131	-3.328	-6.051	-2.919	-7.232
117	-17.244	-13.082	17.244	-10.127	-3.356	-6.029	-2.888	-7.279
118	-17.211	-13.101	17.211	-10.128	-3.393	-6.006	-2.852	-7.338
119	-17.172	-13.115	17.172	-10.134	-3.438	-5.983	-2.811	-7.406
120	-17.126	-13.125	17.126	-10.146	-3.496	-5.964	-2.765	-7.483

Table 52

FIG. 76

	Label							
	8	9	10	11	12	13	14	15
Design #								
81	8.945	7.590	10.894	7.590	1.248	2.166	1.131	2.166
82	9.040	7.532	11.014	7.532	1.186	2.227	1.081	2.227
83	9.154	7.464	11.131	7.464	1.111	2.291	1.022	2.291
84	9.291	7.388	11.242	7.388	1.022	2.360	0.950	2.360
85	9.452	7.304	11.344	7.304	0.918	2.436	0.865	2.436
86	9.629	7.215	11.435	7.215	0.803	2.516	0.768	2.516
87	9.809	7.127	11.512	7.127	0.683	2.601	0.664	2.601
88	9.978	7.055	11.580	7.036	0.566	2.685	0.560	2.685
89	10.020	7.040	11.600	7.010	0.540	2.710	0.540	2.710
90	10.127	7.007	11.643	6.939	0.461	2.766	0.461	2.766
91	10.247	6.969	11.696	6.864	0.372	2.841	0.372	2.841
92	10.344	6.939	11.742	6.805	0.297	2.909	0.297	2.909
93	10.423	6.918	11.784	6.758	0.234	2.968	0.234	2.968
94	10.486	6.904	11.823	6.722	0.183	3.019	0.183	3.019
95	10.536	6.897	11.861	6.694	0.141	3.063	0.141	3.063
96	10.575	6.897	11.898	6.673	0.108	3.099	0.108	3.099
97	10.604	6.901	11.939	6.655	0.082	3.128	0.082	3.128
98	10.626	6.911	11.977	6.646	0.065	3.153	0.065	3.153
99	10.633	6.924	12.029	6.627	0.045	3.166	0.045	3.173
100	10.633	6.941	12.082	6.613	0.034	3.175	0.034	3.193
101	10.623	6.961	12.144	6.595	0.025	3.178	0.025	3.207
102	10.600	6.983	12.213	6.572	0.019	3.178	0.019	3.220
103	10.565	7.004	12.293	6.541	0.015	3.172	0.015	3.228
104	10.518	7.024	12.381	6.500	0.012	3.160	0.012	3.234
105	10.464	7.041	12.474	6.451	0.009	3.143	0.009	3.237
106	10.460	7.040	12.480	6.450	0.010	3.140	0.010	3.240
107	10.407	7.055	12.566	6.397	0.008	3.123	0.008	3.238
108	10.352	7.067	12.653	6.342	0.010	3.101	0.002	3.239
109	10.303	7.079	12.731	6.291	0.015	3.077	-0.006	3.241
110	10.260	7.090	12.800	6.244	0.021	3.054	-0.015	3.244
111	10.225	7.103	12.860	6.202	0.029	3.031	-0.025	3.250
112	10.197	7.121	12.913	6.167	0.038	3.010	-0.037	3.259
113	10.172	7.139	12.958	6.134	0.050	2.987	-0.048	3.269
114	10.153	7.163	12.997	6.105	0.063	2.965	-0.063	3.284
115	10.140	7.194	13.030	6.080	0.079	2.942	-0.079	3.303
116	10.131	7.232	13.058	6.056	0.098	2.916	-0.099	3.326
117	10.127	7.280	13.082	6.032	0.122	2.885	-0.122	3.355
118	10.128	7.338	13.101	6.008	0.151	2.850	-0.152	3.392
119	10.135	7.407	13.115	5.985	0.188	2.809	-0.189	3.438
120	10.147	7.484	13.125	5.965	0.235	2.763	-0.236	3.496

Table 53

FIG. 77

	Label							
	0	1	2	3	4	5	6	7
Design #								
121	-17.073	-13.130	17.073	-10.163	-3.570	-5.950	-2.716	-7.565
122	-17.011	-13.129	17.012	-10.183	-3.661	-5.947	-2.667	-7.649
123	-16.970	-13.130	16.970	-10.200	-3.720	-5.950	-2.640	-7.700
124	-16.945	-13.125	16.945	-10.205	-3.765	-5.954	-2.624	-7.729
125	-16.879	-13.119	16.879	-10.228	-3.867	-5.968	-2.591	-7.798
126	-16.817	-13.115	16.817	-10.249	-3.954	-5.984	-2.568	-7.856
127	-16.763	-13.114	16.763	-10.271	-4.022	-5.999	-2.551	-7.903
128	-16.713	-13.115	16.713	-10.292	-4.074	-6.013	-2.539	-7.942
129	-16.667	-13.117	16.667	-10.313	-4.116	-6.026	-2.531	-7.975
130	-16.624	-13.120	16.624	-10.334	-4.149	-6.039	-2.526	-8.005
131	-16.582	-13.123	16.582	-10.356	-4.176	-6.053	-2.524	-8.033
132	-16.540	-13.127	16.541	-10.378	-4.199	-6.067	-2.524	-8.060
133	-16.499	-13.129	16.500	-10.400	-4.220	-6.083	-2.525	-8.087
134	-16.459	-13.132	16.458	-10.422	-4.238	-6.100	-2.528	-8.113
135	-16.418	-13.134	16.417	-10.444	-4.256	-6.119	-2.532	-8.140
136	-16.375	-13.134	16.376	-10.466	-4.275	-6.139	-2.539	-8.167
137	-16.335	-13.135	16.332	-10.487	-4.293	-6.162	-2.545	-8.195
138	-16.291	-13.134	16.290	-10.508	-4.312	-6.186	-2.555	-8.223
139	-16.249	-13.132	16.247	-10.528	-4.332	-6.212	-2.565	-8.251
140	-16.204	-13.129	16.204	-10.548	-4.354	-6.239	-2.577	-8.280
141	-16.180	-13.130	16.180	-10.560	-4.370	-6.260	-2.590	-8.300
142	-16.160	-13.126	16.161	-10.567	-4.377	-6.267	-2.590	-8.309
143	-16.117	-13.122	16.117	-10.585	-4.400	-6.296	-2.604	-8.337
144	-16.074	-13.117	16.074	-10.603	-4.424	-6.324	-2.619	-8.365
145	-16.031	-13.112	16.032	-10.620	-4.448	-6.353	-2.635	-8.393
146	-15.989	-13.107	15.989	-10.636	-4.472	-6.382	-2.650	-8.419
147	-15.948	-13.102	15.949	-10.652	-4.497	-6.410	-2.666	-8.445
148	-15.910	-13.098	15.908	-10.667	-4.519	-6.437	-2.681	-8.470
149	-15.872	-13.092	15.869	-10.682	-4.542	-6.463	-2.696	-8.495
150	-15.833	-13.087	15.833	-10.695	-4.565	-6.489	-2.712	-8.518
151	-15.797	-13.082	15.797	-10.708	-4.586	-6.513	-2.726	-8.540
152	-15.763	-13.078	15.763	-10.721	-4.606	-6.536	-2.739	-8.562
153	-15.730	-13.073	15.730	-10.733	-4.625	-6.559	-2.752	-8.582
154	-15.698	-13.069	15.698	-10.745	-4.643	-6.580	-2.764	-8.601
155	-15.668	-13.066	15.668	-10.756	-4.660	-6.599	-2.776	-8.619
156	-15.639	-13.062	15.639	-10.767	-4.677	-6.618	-2.787	-8.637
157	-15.610	-13.059	15.610	-10.777	-4.692	-6.637	-2.797	-8.654
158	-15.584	-13.056	15.584	-10.787	-4.707	-6.654	-2.807	-8.670
159	-15.559	-13.053	15.559	-10.796	-4.721	-6.670	-2.816	-8.685
160	-15.535	-13.050	15.535	-10.805	-4.734	-6.685	-2.825	-8.699

Table 54

FIG. 78

	Label							
	8	9	10	11	12	13	14	15
Design #								
121	10.163	7.566	13.130	5.951	0.294	2.713	-0.295	3.570
122	10.184	7.650	13.130	5.947	0.368	2.666	-0.369	3.661
123	10.200	7.700	13.130	5.950	0.420	2.640	-0.420	3.720
124	10.206	7.729	13.125	5.954	0.452	2.623	-0.452	3.765
125	10.228	7.799	13.120	5.969	0.534	2.590	-0.534	3.867
126	10.250	7.856	13.115	5.985	0.604	2.567	-0.604	3.954
127	10.271	7.903	13.114	6.000	0.658	2.550	-0.659	4.022
128	10.292	7.942	13.115	6.013	0.700	2.539	-0.700	4.074
129	10.313	7.975	13.117	6.026	0.732	2.531	-0.732	4.116
130	10.334	8.005	13.120	6.039	0.757	2.526	-0.757	4.149
131	10.356	8.033	13.123	6.053	0.776	2.524	-0.776	4.176
132	10.378	8.060	13.127	6.067	0.791	2.523	-0.791	4.199
133	10.400	8.087	13.130	6.083	0.803	2.525	-0.803	4.220
134	10.422	8.113	13.132	6.100	0.813	2.528	-0.813	4.238
135	10.444	8.140	13.133	6.119	0.822	2.533	-0.821	4.257
136	10.466	8.167	13.135	6.139	0.828	2.538	-0.828	4.274
137	10.487	8.195	13.134	6.163	0.835	2.547	-0.834	4.294
138	10.508	8.223	13.134	6.186	0.840	2.555	-0.840	4.312
139	10.528	8.251	13.131	6.212	0.846	2.566	-0.845	4.333
140	10.548	8.280	13.129	6.239	0.851	2.577	-0.850	4.354
141	10.560	8.300	13.130	6.260	0.850	2.590	-0.850	4.370
142	10.567	8.309	13.126	6.267	0.856	2.590	-0.856	4.376
143	10.585	8.337	13.122	6.296	0.861	2.604	-0.861	4.400
144	10.603	8.365	13.117	6.324	0.867	2.619	-0.866	4.424
145	10.620	8.392	13.113	6.353	0.872	2.634	-0.872	4.448
146	10.636	8.419	13.107	6.382	0.878	2.650	-0.878	4.472
147	10.652	8.446	13.102	6.410	0.883	2.666	-0.884	4.496
148	10.667	8.471	13.096	6.437	0.890	2.682	-0.888	4.520
149	10.681	8.495	13.091	6.464	0.895	2.697	-0.894	4.543
150	10.695	8.518	13.087	6.489	0.899	2.711	-0.900	4.565
151	10.709	8.540	13.082	6.513	0.904	2.726	-0.904	4.586
152	10.721	8.561	13.078	6.537	0.909	2.739	-0.909	4.606
153	10.733	8.582	13.073	6.559	0.914	2.752	-0.914	4.625
154	10.745	8.601	13.070	6.580	0.918	2.764	-0.918	4.643
155	10.756	8.619	13.066	6.599	0.922	2.776	-0.922	4.661
156	10.767	8.637	13.062	6.618	0.926	2.787	-0.926	4.677
157	10.777	8.654	13.059	6.637	0.929	2.797	-0.929	4.692
158	10.787	8.670	13.056	6.654	0.933	2.807	-0.933	4.707
159	10.796	8.685	13.053	6.670	0.936	2.816	-0.936	4.721
160	10.805	8.699	13.050	6.685	0.939	2.825	-0.939	4.734

Table 55

FIG. 79

	Label							
	0	1	2	3	4	5	6	7
Design #								
161	-15.512	-13.048	15.512	-10.814	-4.746	-6.700	-2.833	-8.713
162	-15.489	-13.045	15.489	-10.822	-4.758	-6.713	-2.841	-8.726
163	-15.468	-13.043	15.468	-10.829	-4.770	-6.727	-2.848	-8.738
164	-15.447	-13.040	15.447	-10.837	-4.781	-6.739	-2.856	-8.750
165	-15.428	-13.038	15.428	-10.844	-4.790	-6.751	-2.862	-8.761
166	-15.408	-13.036	15.409	-10.851	-4.801	-6.763	-2.869	-8.773
167	-15.393	-13.034	15.392	-10.857	-4.809	-6.773	-2.875	-8.782
168	-15.375	-13.033	15.374	-10.864	-4.818	-6.784	-2.880	-8.792
169	-15.358	-13.032	15.358	-10.870	-4.826	-6.793	-2.886	-8.801
170	-15.344	-13.030	15.344	-10.875	-4.834	-6.802	-2.891	-8.810
171	-15.328	-13.028	15.328	-10.881	-4.842	-6.811	-2.896	-8.819
172	-15.312	-13.026	15.313	-10.886	-4.850	-6.821	-2.902	-8.827
173	-15.299	-13.025	15.299	-10.891	-4.856	-6.829	-2.906	-8.835
174	-15.288	-13.024	15.288	-10.895	-4.862	-6.836	-2.910	-8.841
175	-15.276	-13.024	15.276	-10.901	-4.867	-6.843	-2.912	-8.849
176	-15.263	-13.023	15.261	-10.905	-4.874	-6.850	-2.917	-8.856
177	-15.252	-13.022	15.251	-10.909	-4.879	-6.856	-2.921	-8.862
178	-15.242	-13.021	15.241	-10.913	-4.885	-6.863	-2.923	-8.869

Table 56

FIG. 80

	Label							
	8	9	10	11	12	13	14	15
Design #								
161	10.813	8.712	13.047	6.699	0.942	2.833	-0.942	4.747
162	10.822	8.726	13.045	6.713	0.945	2.841	-0.945	4.758
163	10.829	8.738	13.042	6.727	0.947	2.848	-0.947	4.770
164	10.837	8.750	13.040	6.740	0.950	2.856	-0.950	4.781
165	10.844	8.761	13.038	6.751	0.952	2.862	-0.952	4.790
166	10.852	8.773	13.037	6.763	0.954	2.869	-0.955	4.801
167	10.857	8.782	13.035	6.773	0.956	2.874	-0.957	4.809
168	10.864	8.792	13.033	6.784	0.959	2.881	-0.958	4.818
169	10.870	8.801	13.032	6.793	0.960	2.886	-0.960	4.826
170	10.875	8.810	13.030	6.802	0.962	2.891	-0.962	4.834
171	10.881	8.819	13.029	6.811	0.964	2.896	-0.964	4.842
172	10.887	8.828	13.027	6.821	0.965	2.901	-0.967	4.849
173	10.891	8.835	13.025	6.829	0.967	2.906	-0.967	4.856
174	10.896	8.842	13.025	6.836	0.968	2.909	-0.969	4.862
175	10.899	8.848	13.023	6.843	0.971	2.914	-0.969	4.868
176	10.905	8.856	13.022	6.851	0.972	2.918	-0.971	4.875
177	10.909	8.861	13.021	6.857	0.973	2.921	-0.972	4.880
178	10.911	8.867	13.019	6.863	0.975	2.926	-0.972	4.886

Table 57

FIG. 81

Design #	SNRs	5.00%	40.00%	50.00%	60.00%	70.00%	100.00%
63	7.4	1.36	1.23	1.1	0.99	0.65	0
64	7.6	1.35	1.22	1.1	0.99	0.65	0
65	7.8	1.24	1.11	1	0.9	0.59	0
66	8	1.17	1.06	0.95	0.85	0.56	0
67	8.2	1.14	1.02	0.92	0.83	0.54	0
68	8.4	1.12	1.01	0.91	0.82	0.59	0
69	8.6	1.23	1.1	0.99	0.8	0.53	0
70	8.8	1.17	0.65	0.58	0.53	0.47	0
71	9	1.17	0.64	0.57	0.52	0.47	0
72	9	1.17	0.64	0.57	0.52	0.47	0
73	9.2	1.17	0.63	0.56	0.51	0.46	0
74	9.4	1.16	0.61	0.55	0.49	0.45	0
75	9.6	1.16	0.6	0.54	0.48	0.44	0
76	9.8	1.15	0.59	0.53	0.48	0.43	0
77	10	1.14	0.58	0.52	0.47	0.42	0
78	10.2	1.18	0.79	0.71	0.64	0.57	0
79	10.4	1.1	0.91	0.82	0.73	0.54	0
80	10.6	1.08	0.97	0.87	0.79	0.57	0
81	10.8	1.04	0.93	0.84	0.68	0.5	0
82	11	1	0.9	0.81	0.73	0.53	0
83	11.2	1.07	0.96	0.87	0.7	0.51	0
84	11.4	1.03	0.92	0.83	0.75	0.55	0
85	11.6	1.09	0.98	0.88	0.71	0.52	0
86	11.8	1.03	0.92	0.83	0.75	0.49	0
87	12	0.97	0.87	0.78	0.7	0.51	0
88	12.2	1.01	0.9	0.81	0.73	0.48	0
89	12.25	0.99	0.89	0.8	0.72	0.52	0
90	12.4	0.94	0.84	0.76	0.68	0.5	0
91	12.6	0.97	0.88	0.79	0.71	0.47	0
92	12.8	0.93	0.83	0.75	0.67	0.49	0
93	13	0.89	0.8	0.72	0.65	0.47	0
94	13.2	0.86	0.77	0.7	0.63	0.46	0
95	13.4	0.93	0.83	0.75	0.68	0.44	0
96	13.6	0.9	0.81	0.73	0.66	0.43	0
97	13.8	0.88	0.79	0.71	0.64	0.42	0
98	14	0.87	0.78	0.69	0.62	0.45	0
99	14.2	0.77	0.69	0.62	0.56	0.45	0
100	14.4	0.83	0.75	0.63	0.57	0.41	0
101	14.6	0.73	0.66	0.59	0.53	0.39	0
102	14.8	0.72	0.65	0.55	0.5	0.4	0
103	15	0.71	0.64	0.52	0.47	0.38	0

Table 58

FIG. 82

Design #	SNRs	5.00%	40.00%	50.00%	60.00%	70.00%	100.00%
104	15.2	0.7	0.63	0.49	0.44	0.36	0
105	15.4	0.68	0.61	0.47	0.43	0.34	0
106	15.42	0.68	0.61	0.47	0.42	0.38	0
107	15.6	0.67	0.6	0.47	0.42	0.34	0
108	15.8	0.72	0.65	0.46	0.41	0.33	0
109	16	0.63	0.57	0.45	0.41	0.33	0
110	16.2	0.61	0.55	0.44	0.4	0.32	0
111	16.4	0.6	0.54	0.43	0.39	0.32	0
112	16.6	0.58	0.53	0.42	0.38	0.31	0
113	16.8	0.57	0.52	0.41	0.37	0.3	0
114	17	0.56	0.5	0.4	0.36	0.26	0
115	17.2	0.49	0.44	0.38	0.35	0.28	0
116	17.4	0.53	0.47	0.37	0.33	0.27	0
117	17.6	0.51	0.46	0.35	0.31	0.25	0
118	17.8	0.48	0.43	0.32	0.29	0.23	0
119	18	0.46	0.41	0.34	0.3	0.25	0
120	18.2	0.43	0.39	0.35	0.31	0.23	0
121	18.4	0.4	0.36	0.33	0.29	0.21	0
122	18.6	0.42	0.38	0.34	0.31	0.2	0
123	18.72	0.39	0.35	0.31	0.28	0.21	0
124	18.8	0.39	0.35	0.32	0.29	0.21	0
125	19	0.37	0.33	0.3	0.27	0.2	0
126	19.2	0.39	0.35	0.3	0.27	0.2	0
127	19.4	0.37	0.33	0.28	0.25	0.18	0
128	19.6	0.34	0.31	0.26	0.24	0.19	0
129	19.8	0.36	0.32	0.25	0.23	0.18	0
130	20	0.33	0.3	0.27	0.24	0.18	0
131	20.2	0.34	0.31	0.28	0.23	0.16	0
132	20.4	0.32	0.29	0.26	0.23	0.17	0
133	20.6	0.3	0.27	0.24	0.22	0.16	0
134	20.8	0.27	0.25	0.22	0.2	0.15	0
135	21	0.28	0.25	0.23	0.21	0.14	0
136	21.2	0.26	0.24	0.21	0.19	0.14	0
137	21.4	0.26	0.23	0.21	0.19	0.14	0
138	21.6	0.25	0.22	0.2	0.18	0.12	0
139	21.8	0.24	0.21	0.19	0.17	0.13	0
140	22	0.23	0.21	0.19	0.17	0.11	0
141	22.13	0.2	0.18	0.16	0.15	0.11	0
142	22.2	0.2	0.18	0.16	0.14	0.11	0
143	22.4	0.19	0.17	0.15	0.14	0.1	0
144	22.6	0.18	0.17	0.15	0.13	0.1	0

Table 59

FIG. 83

Design #	SNRs	5.00%	40.00%	50.00%	60.00%	70.00%	100.00%
145	22.8	0.18	0.16	0.14	0.13	0.09	0
146	23	0.17	0.15	0.14	0.12	0.09	0
147	23.2	0.16	0.14	0.13	0.12	0.08	0
148	23.4	0.15	0.14	0.12	0.11	0.08	0
149	23.6	0.13	0.12	0.11	0.1	0.07	0
150	23.8	0.14	0.13	0.11	0.1	0.07	0
151	24	0.12	0.11	0.1	0.09	0.06	0
152	24.2	0.12	0.1	0.09	0.08	0.06	0
153	24.4	0.11	0.1	0.09	0.08	0.06	0
154	24.6	0.11	0.09	0.09	0.08	0.06	0
155	24.8	0.1	0.09	0.08	0.07	0.05	0
156	25	0.1	0.09	0.08	0.07	0.05	0
157	25.2	0.09	0.08	0.07	0.07	0.05	0
158	25.4	0.09	0.08	0.07	0.06	0.05	0
159	25.6	0.08	0.08	0.07	0.06	0.04	0
160	25.8	0.08	0.07	0.06	0.06	0.04	0
161	26	0.08	0.07	0.06	0.06	0.04	0
162	26.2	0.07	0.07	0.06	0.05	0.04	0
163	26.4	0.07	0.06	0.06	0.05	0.04	0
164	26.6	0.07	0.06	0.05	0.05	0.04	0
165	26.8	0.06	0.06	0.05	0.05	0.03	0
166	27	0.06	0.05	0.05	0.04	0.03	0
167	27.2	0.05	0.05	0.04	0.04	0.03	0
168	27.4	0.06	0.05	0.05	0.04	0.03	0
169	27.6	0.05	0.05	0.04	0.04	0.03	0
170	27.8	0.05	0.04	0.04	0.03	0.02	0
171	28	0.05	0.04	0.04	0.04	0.03	0
172	28.2	0.05	0.04	0.04	0.03	0.02	0
173	28.4	0.04	0.04	0.03	0.03	0.02	0
174	28.6	0.04	0.04	0.03	0.03	0.02	0
175	28.8	0.04	0.03	0.03	0.03	0.02	0
176	29	0.03	0.03	0.03	0.03	0.02	0
177	29.2	0.03	0.03	0.03	0.02	0.02	0
178	29.4	0.03	0.03	0.03	0.02	0.02	0

Table 60

FIG. 84

	SNR	Opt. Cap	Std. Cap	Gain [bits]	Gain %
Design #					
1	-5.000	0.1982	0.1980	0.0002	0.0804
2	-4.800	0.2063	0.2061	0.0002	0.0894
3	-4.600	0.2147	0.2145	0.0002	0.0992
4	-4.400	0.2234	0.2232	0.0002	0.1099
5	-4.200	0.2324	0.2322	0.0003	0.1217
6	-4.000	0.2417	0.2414	0.0003	0.1346
7	-3.800	0.2514	0.2510	0.0004	0.1488
8	-3.600	0.2613	0.2609	0.0004	0.1642
9	-3.400	0.2715	0.2711	0.0005	0.1809
10	-3.200	0.2821	0.2816	0.0006	0.1992
11	-3.000	0.2931	0.2924	0.0006	0.2190
12	-2.800	0.3043	0.3036	0.0007	0.2405
13	-2.600	0.3159	0.3151	0.0008	0.2637
14	-2.400	0.3279	0.3269	0.0009	0.2888
15	-2.200	0.3402	0.3391	0.0011	0.3159
16	-2.000	0.3529	0.3516	0.0012	0.3451
17	-1.800	0.3659	0.3645	0.0014	0.3764
18	-1.600	0.3793	0.3777	0.0015	0.4100
19	-1.400	0.3931	0.3913	0.0017	0.4460
20	-1.200	0.4072	0.4052	0.0020	0.4845
21	-1.000	0.4217	0.4195	0.0022	0.5255
22	-0.800	0.4366	0.4341	0.0025	0.5692
23	-0.600	0.4519	0.4491	0.0028	0.6155
24	-0.400	0.4675	0.4644	0.0031	0.6647
25	-0.200	0.4836	0.4801	0.0034	0.7167
26	0.000	0.5000	0.4962	0.0038	0.7716
27	0.200	0.5168	0.5125	0.0043	0.8294
28	0.400	0.5340	0.5292	0.0047	0.8902
29	0.600	0.5515	0.5463	0.0052	0.9540
30	0.800	0.5695	0.5637	0.0058	1.0207
31	1.000	0.5878	0.5814	0.0063	1.0903
32	1.200	0.6065	0.5995	0.0070	1.1629
33	1.400	0.6255	0.6179	0.0077	1.2383
34	1.600	0.6450	0.6366	0.0084	1.3165
35	1.800	0.6648	0.6556	0.0092	1.3973
36	2.000	0.6850	0.6750	0.0100	1.4807
37	2.200	0.7055	0.6946	0.0109	1.5665
38	2.400	0.7264	0.7146	0.0118	1.6545
39	2.600	0.7476	0.7348	0.0128	1.7448
40	2.800	0.7692	0.7553	0.0139	1.8370

Table 61

FIG. 85

	SNR	Opt. Cap	Std. Cap	Gain [bits]	Gain %
Design #					
41	3.000	0.7912	0.7762	0.0150	1.9309
42	3.200	0.8134	0.7973	0.0162	2.0265
43	3.400	0.8360	0.8186	0.0174	2.1237
44	3.600	0.8589	0.8403	0.0187	2.2223
45	3.800	0.8822	0.8622	0.0200	2.3216
46	4.000	0.9057	0.8843	0.0214	2.4217
47	4.200	0.9296	0.9067	0.0229	2.5225
48	4.400	0.9538	0.9294	0.0244	2.6237
49	4.600	0.9782	0.9523	0.0260	2.7253
50	4.776	1.0000	0.9726	0.0274	2.8172
51	4.800	1.0030	0.9754	0.0276	2.8268
52	5.000	1.0280	0.9988	0.0292	2.9281
53	5.200	1.0533	1.0223	0.0310	3.0290
54	5.400	1.0789	1.0461	0.0327	3.1291
55	5.600	1.1047	1.0702	0.0345	3.2281
56	5.800	1.1308	1.0944	0.0364	3.3258
57	6.000	1.1571	1.1188	0.0383	3.4217
58	6.200	1.1836	1.1434	0.0402	3.5157
59	6.400	1.2104	1.1682	0.0422	3.6083
60	6.600	1.2374	1.1932	0.0441	3.6994
61	6.800	1.2646	1.2184	0.0462	3.7888
62	7.000	1.2920	1.2438	0.0482	3.8764
63	7.200	1.3197	1.2694	0.0503	3.9615
64	7.400	1.3475	1.2951	0.0524	4.0439
65	7.600	1.3755	1.3210	0.0545	4.1236
66	7.800	1.4037	1.3471	0.0566	4.2007
67	8.000	1.4320	1.3733	0.0587	4.2754
68	8.200	1.4605	1.3997	0.0609	4.3475
69	8.400	1.4892	1.4262	0.0630	4.4169
70	8.475	1.5000	1.4362	0.0638	4.4423
71	8.600	1.5180	1.4529	0.0651	4.4836
72	8.800	1.5470	1.4797	0.0673	4.5478
73	9.000	1.5762	1.5067	0.0695	4.6094
74	9.200	1.6054	1.5338	0.0716	4.6679
75	9.400	1.6348	1.5611	0.0737	4.7231
76	9.600	1.6643	1.5885	0.0758	4.7749
77	9.800	1.6940	1.6160	0.0779	4.8235
78	10.000	1.7237	1.6437	0.0800	4.8693
79	10.200	1.7536	1.6715	0.0821	4.9121
80	10.400	1.7835	1.6994	0.0842	4.9523

Table 62

FIG. 86

	SNR	Opt. Cap	Std. Cap	Gain [bits]	Gain %
Design #					
81	10.600	1.8136	1.7274	0.0862	4.9903
82	10.800	1.8437	1.7555	0.0882	5.0256
83	11.000	1.8740	1.7838	0.0902	5.0582
84	11.200	1.9043	1.8121	0.0922	5.0883
85	11.400	1.9348	1.8406	0.0942	5.1158
86	11.600	1.9653	1.8692	0.0961	5.1407
87	11.800	1.9959	1.8979	0.0980	5.1630
88	11.827	2.0000	1.9018	0.0982	5.1635
89	12.000	2.0265	1.9267	0.0998	5.1824
90	12.200	2.0572	1.9555	0.1017	5.1988
91	12.400	2.0880	1.9845	0.1034	5.2121
92	12.600	2.1188	2.0136	0.1052	5.2225
93	12.800	2.1496	2.0428	0.1069	5.2307
94	13.000	2.1805	2.0720	0.1085	5.2365
95	13.200	2.2115	2.1014	0.1101	5.2400
96	13.400	2.2425	2.1308	0.1117	5.2417
97	13.600	2.2736	2.1603	0.1132	5.2416
98	13.800	2.3047	2.1899	0.1147	5.2398
99	14.000	2.3358	2.2196	0.1162	5.2362
100	14.200	2.3670	2.2494	0.1177	5.2310
101	14.400	2.3983	2.2792	0.1191	5.2241
102	14.600	2.4296	2.3091	0.1204	5.2155
103	14.800	2.4609	2.3391	0.1218	5.2052
104	15.000	2.4922	2.3692	0.1230	5.1934
105	15.050	2.5000	2.3766	0.1234	5.1923
106	15.200	2.5236	2.3993	0.1243	5.1802
107	15.400	2.5550	2.4295	0.1255	5.1654
108	15.600	2.5864	2.4598	0.1267	5.1492
109	15.800	2.6179	2.4901	0.1278	5.1316
110	16.000	2.6493	2.5205	0.1289	5.1124
111	16.200	2.6808	2.5509	0.1299	5.0918
112	16.400	2.7123	2.5814	0.1309	5.0696
113	16.600	2.7438	2.6120	0.1318	5.0459
114	16.800	2.7753	2.6426	0.1327	5.0207
115	17.000	2.8068	2.6733	0.1335	4.9940
116	17.200	2.8383	2.7041	0.1343	4.9658
117	17.400	2.8698	2.7348	0.1350	4.9361
118	17.600	2.9013	2.7657	0.1357	4.9051
119	17.800	2.9329	2.7966	0.1363	4.8727
120	18.000	2.9643	2.8275	0.1368	4.8389

Table 63

FIG. 87

	SNR	Opt. Cap	Std. Cap	Gain [bits]	Gain %
Design #					
121	18.200	2.9958	2.8585	0.1373	4.8038
122	18.226	3.0000	2.8626	0.1374	4.7998
123	18.400	3.0273	2.8896	0.1378	4.7674
124	18.600	3.0588	2.9206	0.1381	4.7297
125	18.800	3.0902	2.9518	0.1385	4.6907
126	19.000	3.1217	2.9830	0.1387	4.6505
127	19.200	3.1531	3.0142	0.1389	4.6090
128	19.400	3.1845	3.0454	0.1391	4.5663
129	19.600	3.2159	3.0767	0.1391	4.5223
130	19.800	3.2472	3.1081	0.1392	4.4772
131	20.000	3.2786	3.1395	0.1391	4.4307
132	20.200	3.3099	3.1709	0.1390	4.3831
133	20.400	3.3411	3.2023	0.1388	4.3342
134	20.600	3.3723	3.2338	0.1385	4.2841
135	20.800	3.4035	3.2653	0.1382	4.2328
136	21.000	3.4347	3.2969	0.1378	4.1802
137	21.200	3.4658	3.3285	0.1373	4.1265
138	21.400	3.4969	3.3601	0.1368	4.0714
139	21.420	3.5000	3.3633	0.1367	4.0645
140	21.600	3.5279	3.3917	0.1362	4.0151
141	21.800	3.5589	3.4234	0.1355	3.9576
142	22.000	3.5898	3.4551	0.1347	3.8988
143	22.200	3.6207	3.4869	0.1338	3.8386
144	22.400	3.6515	3.5186	0.1329	3.7772
145	22.600	3.6823	3.5504	0.1319	3.7144
146	22.800	3.7130	3.5823	0.1308	3.6503
147	23.000	3.7437	3.6141	0.1296	3.5848
148	23.200	3.7742	3.6460	0.1283	3.5179
149	23.400	3.8047	3.6779	0.1269	3.4495
150	23.600	3.8351	3.7098	0.1254	3.3797
151	23.800	3.8655	3.7417	0.1238	3.3084
152	24.000	3.8958	3.7737	0.1221	3.2356
153	24.200	3.9259	3.8056	0.1203	3.1611
154	24.400	3.9560	3.8376	0.1184	3.0851
155	24.600	3.9860	3.8696	0.1164	3.0074
156	24.694	4.0000	3.8846	0.1154	2.9707
157	24.800	4.0159	3.9016	0.1142	2.9280
158	25.000	4.0457	3.9337	0.1120	2.8470
159	25.200	4.0753	3.9657	0.1096	2.7642
160	25.400	4.1049	3.9978	0.1071	2.6798

Table 64

FIG. 88

	SNR	Opt. Cap	Std. Cap	Gain [bits]	Gain %
Design #					
161	25.600	4.1343	4.0298	0.1045	2.5936
162	25.800	4.1636	4.0618	0.1018	2.5059
163	26.000	4.1928	4.0938	0.0989	2.4166
164	26.200	4.2218	4.1258	0.0960	2.3259
165	26.400	4.2507	4.1578	0.0929	2.2339
166	26.600	4.2793	4.1896	0.0897	2.1408
167	26.800	4.3079	4.2214	0.0864	2.0470
168	27.000	4.3362	4.2531	0.0830	1.9525
169	27.200	4.3643	4.2847	0.0796	1.8579
170	27.400	4.3922	4.3161	0.0761	1.7634
171	27.600	4.4199	4.3473	0.0726	1.6694
172	27.800	4.4473	4.3782	0.0690	1.5763
173	28.000	4.4744	4.4089	0.0655	1.4846
174	28.192	4.5000	4.4380	0.0620	1.3970
175	28.200	4.5011	4.4392	0.0619	1.3945
176	28.400	4.5276	4.4692	0.0584	1.3065
177	28.600	4.5536	4.4987	0.0549	1.2209
178	28.800	4.5793	4.5277	0.0515	1.1379
179	29.000	4.6044	4.5562	0.0482	1.0577
180	29.200	4.6290	4.5841	0.0450	0.9806
181	29.400	4.6531	4.6113	0.0418	0.9067
182	29.600	4.6765	4.6378	0.0388	0.8361
183	29.800	4.6993	4.6635	0.0359	0.7687
184	30.000	4.7214	4.6884	0.0330	0.7048
185	30.200	4.7427	4.7124	0.0304	0.6442
186	30.400	4.7632	4.7354	0.0278	0.5870
187	30.600	4.7829	4.7575	0.0254	0.5332
188	30.800	4.8017	4.7786	0.0231	0.4826
189	31.000	4.8196	4.7987	0.0209	0.4352
190	31.200	4.8366	4.8177	0.0188	0.3910
191	31.400	4.8526	4.8356	0.0169	0.3500
192	31.600	4.8676	4.8525	0.0151	0.3119
193	31.800	4.8817	4.8682	0.0135	0.2768
194	32.000	4.8948	4.8828	0.0119	0.2445
195	32.200	4.9069	4.8964	0.0105	0.2149
196	32.400	4.9181	4.9088	0.0092	0.1880
197	32.600	4.9283	4.9203	0.0080	0.1636
198	32.800	4.9376	4.9307	0.0070	0.1415
199	33.000	4.9461	4.9401	0.0060	0.1217
200	33.200	4.9537	4.9485	0.0051	0.1041

Table 65

FIG. 89

	SNR	Opt. Cap	Std. Cap	Gain [bits]	Gain %
Design #					
201	33.400	4.9605	4.9561	0.0044	0.0884
202	33.600	4.9665	4.9628	0.0037	0.0746
203	33.800	4.9718	4.9687	0.0031	0.0625
204	34.000	4.9765	4.9739	0.0026	0.0520
205	34.200	4.9805	4.9784	0.0021	0.0429
206	34.400	4.9840	4.9823	0.0017	0.0351
207	34.600	4.9870	4.9856	0.0014	0.0285
208	34.800	4.9895	4.9884	0.0011	0.0229
209	35.000	4.9916	4.9907	0.0009	0.0183
210	35.200	4.9934	4.9927	0.0007	0.0144
211	35.400	4.9948	4.9943	0.0006	0.0112
212	35.600	4.9960	4.9956	0.0004	0.0087

Table 66

FIG. 90

	Label							
	0	1	2	3	4	5	6	7
Design #								
1	-45.343	-24.394	-22.729	-22.548	-19.985	-18.269	-17.663	-14.325
2	-45.283	-24.883	-23.866	-21.906	-18.916	-18.279	-17.226	-15.598
3	-45.204	-23.374	-22.109	-19.418	-20.610	-22.694	-19.681	-19.323
4	-45.358	-20.100	-20.409	-20.348	-20.339	-20.192	-20.138	-20.147
5	-45.157	-29.835	-16.217	-16.186	-16.191	-16.174	-16.180	-16.171
6	-45.052	-27.227	-26.705	-14.338	-14.246	-14.277	-14.357	-14.108
7	-45.255	-18.839	-23.089	-23.230	-19.868	-21.696	-21.424	-13.250
8	-24.362	-45.114	-22.442	-22.568	-19.567	-15.644	3.330	-1.541
9	-45.303	-21.093	-20.986	-19.939	-20.641	-20.205	-20.253	-19.419
10	-45.073	-21.391	-21.412	-21.316	-21.414	-21.401	-21.433	-21.295
11	-45.215	-21.016	-21.354	-21.801	-21.401	-21.841	-20.198	-16.773
12	-45.219	-19.542	-19.569	-20.712	-21.194	-20.510	-20.220	-21.190
13	-17.864	-45.095	-24.540	-22.942	-23.784	-18.452	-13.887	-17.940
14	-45.158	-20.872	-20.650	-20.889	-20.103	-20.425	-20.291	-20.430
15	-45.118	-20.368	-20.347	-20.452	-20.577	-20.637	-20.511	-20.575
16	-45.172	-20.834	-19.751	-20.049	-20.844	-19.309	-20.258	-21.056
17	-45.108	-20.531	-20.445	-20.446	-20.492	-20.508	-20.508	-20.518
18	-45.094	-22.132	-22.129	-21.433	-21.433	-21.450	-16.562	-16.560
19	-45.032	-20.649	-20.648	-20.648	-20.650	-20.558	-20.552	-20.553
20	-45.043	-20.498	-20.551	-20.740	-20.638	-20.664	-20.223	-20.505
21	-44.984	-20.591	-20.757	-20.602	-20.753	-20.530	-20.561	-20.568
22	-44.957	-20.684	-20.684	-20.657	-20.646	-20.650	-20.652	-20.652
23	-44.931	-20.682	-20.682	-20.682	-20.682	-20.682	-20.682	-20.672
24	-44.914	-20.681	-20.681	-20.681	-20.681	-20.681	-20.681	-20.681
25	-44.884	-20.700	-20.710	-20.704	-20.706	-20.699	-20.706	-20.712
26	-44.850	-20.750	-20.740	-20.740	-20.740	-20.740	-20.740	-20.740
27	-44.829	-20.756	-20.756	-20.756	-20.756	-20.756	-20.756	-20.756
28	-44.817	-20.760	-20.760	-20.760	-20.762	-20.762	-20.762	-20.752
29	-44.805	-20.765	-20.764	-20.764	-20.764	-20.762	-20.761	-20.764
30	-44.786	-20.777	-20.781	-20.775	-20.772	-20.794	-20.766	-20.790
31	-44.736	-21.134	-21.019	-21.139	-21.139	-21.111	-21.114	-21.123
32	-44.702	-21.199	-21.183	-21.183	-21.183	-21.183	-21.183	-21.183
33	-44.668	-21.250	-21.250	-21.247	-21.249	-21.253	-21.255	-21.248
34	-44.635	-21.306	-21.306	-21.306	-21.306	-21.306	-21.301	-21.300
35	-44.604	-21.353	-21.353	-21.353	-21.353	-21.351	-21.351	-21.351
36	-44.573	-21.391	-21.391	-21.391	-21.391	-21.395	-21.395	-21.395
37	-44.543	-21.431	-21.430	-21.430	-21.430	-21.430	-21.428	-21.428
38	-44.486	-21.617	-21.657	-21.541	-21.590	-21.608	-21.546	-21.516
39	-44.404	-21.764	-21.767	-21.777	-21.785	-21.778	-21.774	-21.770
40	-44.380	-21.767	-21.794	-21.780	-21.780	-21.788	-21.789	-21.789

Table 67

FIG. 91

	Label							
	8	9	10	11	12	13	14	15
Design #								
1	-13.635	-11.934	-8.649	-6.824	-5.114	-4.635	-3.002	-1.841
2	-12.831	-10.336	-9.442	-8.114	-5.012	-3.798	-3.272	-2.251
3	-4.779	-3.027	-3.096	-2.272	-0.919	-1.470	-2.114	-0.429
4	-20.325	-7.492	-2.105	-1.838	-1.625	-1.116	-1.116	-1.127
5	-16.199	-16.203	-13.514	-11.005	-8.551	-7.350	-4.689	-3.100
6	-14.280	-14.036	-14.051	-14.399	-12.854	-1.255	-0.433	1.263
7	-11.272	-14.648	-4.877	-6.864	-0.261	-3.154	-4.705	-2.791
8	2.680	-0.839	-22.596	-17.342	-9.498	-9.135	-3.810	-5.056
9	-19.872	-5.248	-1.888	-1.112	-1.283	-1.245	-1.367	-0.633
10	-4.409	-4.056	-3.087	-3.109	-3.056	-2.997	-2.974	-2.994
11	-15.579	-10.382	-7.645	-2.175	-1.624	-0.887	-1.247	-1.441
12	-19.896	-8.370	-2.717	-2.138	-0.283	-0.277	-0.303	-1.010
13	-15.407	-15.505	-3.399	-2.573	-3.270	-3.907	2.693	0.560
14	-20.141	-4.751	-2.071	-1.303	-0.418	-0.959	-1.139	-0.930
15	-20.770	-2.574	-0.053	-1.009	-1.099	-0.986	-1.226	-0.812
16	-20.343	-12.201	0.377	1.140	-0.046	1.530	0.760	0.683
17	-20.495	-7.614	-1.738	-1.162	-0.583	-0.540	-0.526	-0.545
18	-16.560	-16.560	-0.513	0.198	0.226	0.659	1.095	1.087
19	-20.552	-1.210	-0.755	-0.754	-0.754	-0.756	-0.756	-0.756
20	-20.469	-8.598	1.013	1.057	0.913	0.724	0.947	0.744
21	-20.712	-1.009	-0.885	-1.016	-0.934	-0.885	-0.996	-0.906
22	-20.652	-0.569	-0.569	-0.569	-0.569	-0.569	-0.569	-0.532
23	-20.673	-0.459	-0.460	-0.459	-0.459	-0.459	-0.459	-0.459
24	-20.681	-5.138	0.198	0.198	0.198	0.198	0.198	0.198
25	-20.742	-4.073	0.302	0.292	0.297	0.291	0.302	0.293
26	-20.730	-0.420	-0.380	-0.360	-0.320	-0.300	-0.280	-0.230
27	-20.756	-0.082	0.006	0.006	0.006	0.006	0.006	0.006
28	-20.752	-0.007	-0.007	-0.007	-0.010	0.001	-0.010	0.000
29	-20.754	-0.001	-0.002	-0.001	-0.002	-0.003	-0.004	-0.002
30	-20.715	0.011	0.013	0.011	0.014	0.012	0.011	0.010
31	-18.293	0.011	-0.004	0.004	-0.005	0.008	-0.020	-0.001
32	-17.778	-0.004	-0.004	-0.004	-0.004	-0.004	-0.004	0.003
33	-17.315	-0.003	0.000	-0.004	0.001	0.000	-0.002	0.003
34	-16.932	-0.005	-0.005	0.001	0.001	0.001	0.001	0.001
35	-16.587	-0.013	-0.010	-0.008	-0.009	0.004	0.004	0.004
36	-16.301	-0.017	-0.011	-0.011	0.004	0.004	0.004	0.004
37	-16.041	-0.004	-0.004	-0.004	-0.004	-0.004	-0.004	-0.004
38	-13.874	-3.119	-3.130	-2.370	0.046	0.224	0.372	-0.010
39	-4.540	-4.609	-4.579	-4.575	-4.642	-4.538	-4.465	-4.463
40	-4.516	-4.521	-4.550	-4.546	-4.540	-4.557	-4.537	-4.536

Table 68

FIG. 92

	Label							
	16	17	18	19	20	21	22	23
Design #								
1	0.559	0.878	1.628	7.378	8.322	13.022	13.872	13.904
2	-1.704	3.042	3.725	7.812	9.088	9.252	9.824	13.966
3	-3.795	-5.863	-7.934	-6.868	18.715	18.996	20.161	15.141
4	-1.369	-0.980	-0.902	-0.750	-0.105	11.883	15.567	15.460
5	6.651	7.690	12.424	12.446	12.429	12.433	12.427	12.454
6	1.620	3.323	3.412	4.223	6.954	8.333	13.210	16.400
7	0.423	-0.188	1.768	1.979	5.146	12.533	19.507	17.546
8	-5.326	-5.776	-6.925	8.076	-0.329	7.836	21.080	19.904
9	-1.159	-2.404	-1.143	-1.834	18.015	-1.591	16.255	16.368
10	-3.042	-3.091	-3.066	-2.633	4.068	9.019	19.530	19.493
11	1.066	1.431	1.863	2.221	3.093	5.760	8.956	15.215
12	-0.833	-1.102	1.022	0.334	1.654	5.346	8.910	19.145
13	-1.453	-0.557	-1.031	4.251	-1.363	19.205	23.735	17.787
14	-0.890	-0.800	-0.582	0.426	0.057	2.811	14.025	15.501
15	-0.834	-0.404	-0.640	-0.676	-0.608	0.390	12.322	20.810
16	1.356	1.543	0.606	0.849	0.368	0.937	0.269	20.383
17	-0.104	-0.019	0.225	0.802	2.289	3.473	5.851	20.505
18	1.097	1.095	1.102	1.095	1.095	1.095	1.090	19.720
19	-0.756	-0.755	-0.494	-0.414	-0.413	-0.174	9.614	20.386
20	0.904	0.792	0.627	0.791	0.617	-0.641	-0.520	20.637
21	-1.020	-0.917	-0.884	-1.015	5.030	5.165	20.457	20.734
22	-0.569	-0.532	-0.545	-0.557	-0.542	-0.072	7.122	20.594
23	-0.459	-0.459	-0.460	-0.459	-0.459	-0.459	6.213	20.636
24	0.238	0.249	0.653	0.668	0.668	0.668	0.668	20.696
25	0.303	0.298	0.313	0.318	0.321	0.324	0.351	20.731
26	-0.160	-0.070	-0.030	-0.030	-0.010	0.010	2.590	20.730
27	0.006	0.006	0.006	0.006	0.006	0.006	0.006	20.734
28	-0.008	0.005	0.010	0.006	0.006	0.011	0.009	20.762
29	-0.003	-0.003	-0.003	-0.003	-0.003	0.014	0.016	20.734
30	0.009	0.006	0.008	0.014	0.012	0.010	0.016	18.707
31	-0.001	0.017	-0.021	0.023	-0.011	21.115	21.080	-0.032
32	0.003	0.003	0.003	0.003	0.003	0.003	0.003	17.791
33	-0.001	0.000	0.001	0.000	0.001	0.001	0.003	17.320
34	0.001	0.001	0.001	0.001	0.001	0.001	0.002	16.920
35	0.004	0.004	0.004	0.004	0.004	0.004	0.004	16.590
36	0.004	0.003	0.003	0.003	0.003	0.003	0.003	16.298
37	-0.004	-0.004	-0.004	-0.004	0.015	0.015	0.015	16.041
38	-0.001	-0.158	-0.092	0.249	2.273	2.631	3.034	13.943
39	4.450	4.538	4.602	4.675	4.557	4.555	4.550	4.485
40	4.533	4.547	4.538	4.524	4.524	4.538	4.568	4.532

Table 69

FIG. 93

	Label							
	24	25	26	27	28	29	30	31
Design #								
1	16.228	16.944	17.064	17.457	18.036	23.620	26.682	45.294
2	17.928	17.982	18.192	19.553	20.125	20.783	26.101	45.344
3	19.782	17.858	12.125	20.371	5.939	19.767	20.586	45.539
4	18.190	18.596	18.715	18.637	18.711	22.562	24.189	45.372
5	12.433	12.435	12.444	12.434	12.433	28.408	28.406	44.777
6	18.299	18.306	18.313	18.364	18.214	18.234	27.926	45.223
7	16.584	18.303	17.321	14.171	18.208	19.779	26.886	45.258
8	14.532	23.670	18.114	16.877	22.057	16.800	17.548	45.369
9	17.625	16.310	16.764	16.787	17.047	21.555	26.663	45.231
10	19.360	19.413	19.361	19.445	19.349	19.391	19.391	45.431
11	19.561	21.712	21.119	21.344	20.929	21.212	19.875	45.222
12	21.093	20.712	20.654	19.848	20.639	19.954	20.537	45.233
13	25.021	18.153	20.805	16.034	13.962	13.485	12.121	45.159
14	19.945	21.365	21.592	20.221	20.547	20.507	20.601	45.201
15	20.279	20.327	20.400	20.168	20.126	20.118	20.137	45.198
16	20.621	20.677	20.467	20.558	20.568	20.490	20.580	45.102
17	20.519	20.515	20.448	20.613	20.475	20.513	20.556	45.098
18	20.462	20.637	20.639	20.641	20.665	20.633	21.019	45.074
19	20.448	20.510	20.513	20.511	20.509	20.514	20.507	45.077
20	20.696	20.484	20.699	20.605	20.653	20.514	20.663	45.008
21	20.547	20.590	20.655	20.626	20.600	0.532	20.590	45.000
22	20.596	20.604	20.603	20.607	20.627	20.628	20.636	44.979
23	20.637	20.636	20.636	20.651	20.661	20.661	20.661	44.947
24	20.696	20.697	20.697	20.697	20.697	20.707	20.707	44.905
25	20.710	20.714	20.719	20.714	20.717	20.743	20.708	44.879
26	20.730	20.724	20.736	20.742	20.742	20.738	20.746	44.852
27	20.747	20.758	20.758	20.758	20.758	20.762	20.768	44.829
28	20.757	20.757	20.759	20.758	20.760	20.762	20.757	44.817
29	20.733	20.760	20.760	20.760	20.761	20.760	20.830	44.805
30	21.012	21.041	21.063	21.047	21.040	21.063	21.058	44.767
31	18.509	21.040	21.141	21.071	20.994	-0.005	21.154	44.740
32	21.184	21.184	21.184	21.184	21.184	21.184	21.184	44.702
33	21.240	21.248	21.251	21.252	21.254	21.250	21.252	44.668
34	21.305	21.305	21.305	21.305	21.305	21.305	21.309	44.635
35	21.350	21.352	21.352	21.352	21.353	21.352	21.352	44.604
36	21.379	21.387	21.395	21.399	21.400	21.398	21.394	44.573
37	21.427	21.427	21.427	21.432	21.432	21.432	21.432	44.543
38	21.535	21.638	21.561	21.528	21.640	21.580	21.575	44.487
39	21.768	21.771	21.771	21.773	21.761	21.796	21.773	44.404
40	21.783	21.784	21.779	21.783	21.786	21.784	21.787	44.380

Table 70

FIG. 94

	Label							
	0	1	2	3	4	5	6	7
Design #								
41	-44.331	-22.050	-22.075	-22.065	-22.069	-22.039	-22.053	-20.292
42	-44.215	-22.590	-22.587	-22.587	-22.587	-22.587	-22.586	-15.296
43	-44.114	-22.822	-22.823	-22.822	-22.822	-22.821	-22.821	-7.777
44	-44.082	-22.838	-22.838	-22.838	-22.838	-22.838	-22.838	-6.530
45	-44.052	-22.851	-22.851	-22.851	-22.851	-22.849	-22.847	-6.521
46	-43.976	-23.394	-23.394	-23.392	-23.391	-23.391	-19.819	-6.612
47	-43.890	-23.657	-23.657	-23.657	-23.657	-23.655	-17.939	-6.749
48	-43.769	-23.993	-23.993	-23.992	-23.992	-23.992	-12.510	-8.124
49	-43.747	-23.932	-23.932	-23.932	-23.932	-23.932	-15.409	-7.000
50	-43.690	-24.010	-24.010	-24.010	-24.010	-24.010	-14.480	-7.110
51	-43.685	-24.022	-24.021	-24.021	-24.021	-24.021	-14.359	-7.122
52	-43.628	-24.091	-24.091	-24.091	-24.091	-24.091	-13.389	-7.240
53	-43.575	-24.146	-24.148	-24.147	-24.146	-24.147	-12.479	-7.354
54	-43.526	-24.191	-24.191	-24.191	-24.191	-24.191	-11.630	-7.457
55	-43.480	-24.223	-24.225	-24.227	-24.223	-24.227	-7.537	-7.562
56	-43.435	-24.253	-24.251	-24.252	-24.253	-24.252	-8.209	-8.208
57	-43.393	-24.270	-24.269	-24.269	-24.269	-24.269	-8.182	-8.170
58	-43.323	-24.795	-24.795	-24.795	-24.795	-21.912	-8.434	-8.432
59	-43.224	-25.171	-25.171	-25.170	-25.170	-19.536	-9.211	-9.200
60	-43.143	-25.366	-25.366	-25.366	-25.366	-17.669	-10.066	-10.066
61	-43.058	-25.545	-25.545	-25.545	-25.545	-11.874	-11.891	-11.892
62	-43.009	-25.568	-25.568	-25.568	-25.569	-11.884	-11.875	-11.875
63	-42.959	-25.586	-25.586	-25.586	-25.586	-11.885	-11.885	-11.885
64	-42.907	-25.604	-25.604	-25.604	-25.604	-11.890	-11.889	-11.890
65	-42.832	-26.175	-26.175	-26.175	-23.810	-11.947	-11.947	-11.947
66	-42.761	-26.407	-26.407	-26.407	-23.008	-12.221	-12.221	-12.221
67	-42.685	-26.623	-26.623	-26.623	-22.127	-12.457	-12.457	-12.457
68	-42.617	-26.762	-26.762	-26.762	-21.528	-12.600	-12.600	-12.600
69	-42.547	-26.909	-26.909	-26.909	-20.691	-12.903	-12.905	-12.910
70	-42.530	-26.930	-26.930	-26.930	-20.620	-12.920	-12.920	-12.920
71	-42.477	-27.050	-27.050	-27.050	-19.462	-13.823	-13.823	-13.822
72	-42.415	-27.121	-27.121	-27.121	-18.901	-14.000	-14.000	-13.989
73	-42.351	-27.211	-27.212	-27.211	-15.640	-15.640	-15.640	-15.640
74	-42.293	-27.236	-27.236	-27.236	-15.640	-15.639	-15.639	-15.639
75	-42.232	-27.259	-27.259	-27.259	-15.648	-15.648	-15.648	-15.648
76	-42.169	-27.280	-27.279	-27.279	-15.663	-15.663	-15.663	-15.663
77	-42.094	-27.964	-27.964	-25.850	-15.745	-15.745	-15.745	-15.745
78	-42.024	-28.222	-28.222	-25.276	-15.825	-15.826	-15.826	-15.825
79	-41.959	-28.366	-28.366	-24.979	-15.860	-15.858	-15.860	-15.860
80	-41.887	-28.620	-28.620	-24.173	-16.615	-16.615	-16.616	-16.615

Table 71

FIG. 95

	Label							
	8	9	10	11	12	13	14	15
Design #								
41	-3.639	-3.628	-3.647	-3.629	-3.641	-3.634	-3.627	-3.653
42	-4.609	-4.609	-4.609	-4.609	-4.609	-4.609	-4.609	-4.609
43	-6.370	-6.373	-6.369	-6.369	-6.369	-6.370	-6.368	-6.370
44	-6.527	-6.527	-6.527	-6.527	-6.527	-6.527	-6.524	-6.524
45	-6.521	-6.521	-6.521	-6.521	-6.521	-6.521	-6.521	-6.521
46	-6.612	-6.612	-6.612	-6.612	-6.612	-6.610	-6.610	-6.610
47	-6.749	-6.749	-6.749	-6.748	-6.748	-6.747	-6.746	-6.744
48	-8.124	-8.124	-8.124	-8.124	-8.121	-8.121	-8.121	6.031
49	-7.000	-7.000	-7.000	-7.000	-7.000	-7.000	-7.000	-6.998
50	-7.110	-7.110	-7.110	-7.110	-7.100	-7.100	-7.100	-7.100
51	-7.122	-7.122	-7.122	-7.122	-7.122	-7.122	-7.116	-7.114
52	-7.240	-7.239	-7.239	-7.239	-7.239	-7.234	-7.234	-7.233
53	-7.312	-7.406	-7.344	-7.380	-7.341	-7.346	-7.335	-7.327
54	-7.457	-7.457	-7.457	-7.457	-7.457	-7.457	-7.450	-7.451
55	-7.675	-7.559	-7.013	-7.420	-10.845	-7.658	-7.783	-7.752
56	-8.209	-8.208	-8.209	-8.209	-8.206	-8.172	-8.158	-4.855
57	-8.166	-8.166	-8.166	-8.166	-8.166	-8.166	-8.166	-5.244
58	-8.432	-8.432	-8.432	-8.432	-8.432	-8.432	-8.432	0.000
59	-9.200	-9.200	-9.200	-9.200	-9.200	-9.200	0.506	0.519
60	-10.066	-10.066	-10.063	-10.057	-10.057	-0.011	-0.010	0.005
61	-11.893	-11.892	-11.892	-11.892	-0.308	-0.308	-0.308	-0.310
62	-11.874	-11.874	-11.874	-11.870	-2.509	0.345	0.345	0.345
63	-11.884	-11.885	-11.885	-11.885	-0.377	-0.376	-0.376	-0.371
64	-11.890	-11.890	-11.890	-11.890	-0.365	-0.365	-0.365	-0.365
65	-11.947	-11.947	-11.947	-11.946	-0.003	0.000	0.000	0.000
66	-12.221	-12.221	-12.221	-10.474	-0.012	-0.012	-0.012	-0.012
67	-12.456	-12.456	-12.456	-9.335	0.000	0.000	0.000	0.000
68	-12.600	-12.600	-12.600	-8.667	-0.002	-0.001	-0.001	0.000
69	-12.901	-12.897	-12.902	-3.081	-3.046	-3.034	-3.074	-3.000
70	-12.910	-12.910	-12.910	-3.110	-3.080	-3.020	-3.000	-2.950
71	-13.822	-13.823	-5.103	-5.055	-5.055	-5.054	-5.054	2.768
72	-13.987	-13.987	-4.360	-4.360	-4.360	-4.360	-4.360	-4.360
73	-15.640	-9.495	-4.617	-4.616	-4.616	-4.617	-4.616	-4.614
74	-15.640	-9.565	-4.609	-4.609	-4.609	-4.609	-4.609	-4.608
75	-15.648	-9.562	-4.613	-4.613	-4.613	-4.613	-4.613	-4.613
76	-15.663	-9.504	-4.627	-4.626	-4.626	-4.626	-4.626	-4.626
77	-15.745	-8.854	-4.726	-4.724	-4.724	-4.724	-4.724	-4.724
78	-15.825	-6.846	-5.638	-5.642	-5.644	-5.641	-5.659	0.068
79	-15.859	-5.840	-5.840	-5.840	-5.840	-5.840	-5.839	-0.179
80	-12.278	-6.699	-6.692	-6.691	-6.694	-6.690	0.001	0.002

Table 72

FIG. 96

	Label							
	16	17	18	19	20	21	22	23
Design #								
41	-3.686	-3.668	6.587	6.464	6.471	6.465	6.464	6.507
42	-4.609	6.228	6.228	6.229	6.229	6.229	6.246	6.269
43	5.753	5.801	6.614	6.773	6.758	6.762	6.762	6.750
44	6.524	6.524	6.524	6.524	6.528	6.528	6.528	6.528
45	6.519	6.519	6.519	6.519	6.523	6.523	6.523	6.523
46	6.611	6.611	6.611	6.611	6.611	6.611	6.611	6.611
47	6.741	6.746	6.746	6.749	6.749	6.749	6.749	6.749
48	6.031	6.031	6.031	6.032	6.032	6.032	6.033	6.035
49	7.000	7.000	7.000	7.000	7.000	7.000	7.000	7.000
50	7.100	7.100	7.100	7.100	7.110	7.110	7.110	7.110
51	7.120	7.120	7.120	7.121	7.121	7.121	7.121	7.121
52	7.237	7.237	7.237	7.237	7.237	7.238	7.238	7.238
53	7.399	7.365	7.267	7.327	7.392	7.354	7.264	7.414
54	7.444	7.457	7.457	7.457	7.457	7.457	7.457	7.457
55	7.469	7.260	7.080	8.013	10.246	9.165	7.233	8.013
56	4.856	8.207	8.190	8.190	8.202	8.210	8.186	8.196
57	5.244	8.168	8.168	8.168	8.168	8.168	8.168	8.168
58	0.000	8.432	8.432	8.432	8.432	8.432	8.432	8.432
59	0.524	0.524	3.854	9.711	9.711	9.711	9.711	9.711
60	0.005	0.005	0.005	10.061	10.061	10.061	10.064	10.064
61	-0.310	-0.311	-0.310	2.201	11.885	11.885	11.886	11.885
62	0.345	0.345	0.345	0.384	11.884	11.884	11.885	11.885
63	-0.353	-0.353	-0.354	2.624	11.874	11.874	11.874	11.874
64	-0.365	-0.365	-0.340	2.595	11.879	11.879	11.879	11.879
65	0.000	0.000	0.000	0.002	11.947	11.947	11.947	11.947
66	-0.012	-0.012	-0.012	-0.012	11.972	11.973	11.975	11.975
67	-0.001	0.000	0.000	0.002	9.338	12.455	12.456	12.456
68	-0.001	-0.001	0.002	0.004	8.664	12.601	12.601	12.601
69	2.963	3.151	3.052	3.030	3.041	12.913	12.904	12.896
70	2.900	2.900	3.040	3.090	3.240	12.910	12.910	12.910
71	2.768	2.768	2.769	2.767	2.768	9.507	13.611	13.611
72	4.357	4.357	4.362	4.362	4.362	4.362	13.979	13.996
73	4.613	4.617	4.617	4.617	4.616	4.617	9.495	15.639
74	4.607	4.609	4.610	4.608	4.608	4.609	9.565	15.639
75	4.613	4.613	4.613	4.613	4.613	4.614	9.562	15.647
76	4.626	4.626	4.626	4.626	4.626	4.626	9.504	15.663
77	4.723	4.724	4.724	4.724	4.725	4.725	8.854	15.745
78	0.039	4.532	5.978	6.085	6.071	6.159	6.139	15.825
79	0.179	5.839	5.840	5.839	5.840	5.841	5.841	15.859
80	0.002	-0.004	6.686	6.685	6.689	6.695	6.709	12.278

Table 73

FIG. 97

	Label							
	24	25	26	27	28	29	30	31
Design #								
41	15.111	22.519	22.506	22.519	22.521	22.511	22.503	44.275
42	12.543	22.685	22.685	22.686	22.686	22.688	22.688	44.193
43	6.754	22.824	22.822	22.823	22.823	22.824	22.823	44.113
44	6.535	22.837	22.838	22.838	22.838	22.838	22.838	44.082
45	6.523	22.848	22.849	22.849	22.851	22.851	22.851	44.051
46	6.611	19.820	23.392	23.392	23.392	23.392	23.392	43.976
47	6.749	17.938	23.656	23.656	23.656	23.657	23.657	43.890
48	6.044	19.120	23.583	23.583	23.583	23.583	23.583	43.859
49	7.000	15.409	23.932	23.932	23.932	23.932	23.932	43.747
50	7.120	14.480	24.010	24.010	24.010	24.010	24.010	43.690
51	7.121	14.359	24.022	24.021	24.021	24.021	24.021	43.685
52	7.238	13.389	24.091	24.091	24.091	24.091	24.091	43.628
53	12.477	7.364	24.146	24.146	24.147	24.147	24.148	43.575
54	7.457	11.630	24.191	24.191	24.191	24.191	24.191	43.526
55	7.057	7.253	24.230	24.230	24.227	24.226	24.227	43.479
56	8.190	8.214	24.253	24.252	24.252	24.252	24.252	43.435
57	8.168	8.168	24.269	24.269	24.269	24.270	24.270	43.393
58	8.432	8.433	21.911	24.795	24.795	24.795	24.795	43.323
59	9.711	9.711	19.089	25.210	25.210	25.210	25.210	43.219
60	10.064	10.064	17.669	25.366	25.366	25.366	25.366	43.143
61	11.883	11.882	11.878	25.546	25.546	25.546	25.546	43.058
62	11.885	11.885	11.885	25.567	25.567	25.566	25.566	43.010
63	11.874	11.874	11.874	25.588	25.588	25.588	25.588	42.959
64	11.879	11.879	11.879	25.606	25.606	25.606	25.606	42.907
65	11.947	11.947	11.947	23.810	26.175	26.175	26.175	42.832
66	11.975	11.975	11.977	23.203	26.366	26.366	26.366	42.764
67	12.456	12.456	12.456	22.128	26.622	26.622	26.622	42.685
68	12.600	12.601	12.600	21.527	26.762	26.762	26.762	42.617
69	12.895	12.899	12.910	20.692	26.909	26.910	26.909	42.547
70	12.920	12.920	12.920	20.620	26.930	26.930	26.930	42.530
71	13.612	13.613	13.612	19.786	27.028	27.028	27.028	42.479
72	13.996	13.996	13.996	18.901	27.121	27.121	27.121	42.415
73	15.640	15.640	15.640	15.640	27.211	27.211	27.212	42.351
74	15.639	15.641	15.639	15.640	27.236	27.236	27.236	42.293
75	15.647	15.648	15.648	15.648	27.259	27.259	27.259	42.232
76	15.663	15.663	15.663	15.663	27.279	27.279	27.279	42.169
77	15.745	15.745	15.745	15.745	25.850	27.964	27.964	42.094
78	15.825	15.824	15.825	15.825	25.278	28.221	28.221	42.024
79	15.859	15.859	15.859	15.860	24.979	28.366	28.366	41.959
80	16.616	16.615	16.615	16.615	24.173	28.620	28.620	41.887

Table 74

FIG. 98

	Label							
	0	1	2	3	4	5	6	7
Design #								
81	-41.821	-28.769	-28.769	-23.684	-16.845	-16.844	-16.842	-16.844
82	-41.760	-28.848	-28.848	-23.491	-16.906	-16.906	-16.905	-16.904
83	-41.699	-28.961	-28.960	-23.010	-17.629	-17.630	-17.631	-14.794
84	-41.639	-29.050	-29.050	-22.578	-17.973	-17.973	-17.974	-13.458
85	-41.579	-29.119	-29.119	-22.235	-18.205	-18.206	-18.207	-10.709
86	-41.521	-29.202	-29.202	-19.869	-20.914	-19.870	-15.504	-11.049
87	-41.459	-29.236	-29.236	-20.250	-20.250	-20.250	-11.081	-15.369
88	-41.470	-29.230	-29.230	-20.250	-20.250	-20.250	-15.360	-11.090
89	-41.393	-29.263	-29.263	-20.260	-20.261	-20.262	-15.380	-11.085
90	-41.326	-29.287	-29.287	-20.278	-20.278	-20.277	-15.368	-11.099
91	-41.255	-29.310	-29.310	-20.298	-20.298	-20.299	-15.342	-11.114
92	-41.186	-29.946	-28.676	-20.382	-20.382	-20.382	-14.423	-12.070
93	-41.122	-30.267	-28.358	-20.437	-20.437	-20.437	-11.520	-13.125
94	-41.060	-30.466	-28.172	-20.467	-20.467	-20.467	-13.048	-13.053
95	-41.000	-30.689	-27.922	-20.987	-20.987	-19.413	-13.248	-13.248
96	-40.942	-30.884	-27.690	-21.251	-21.251	-18.827	-13.445	-13.445
97	-40.887	-31.034	-27.518	-21.408	-21.408	-18.464	-13.580	-13.581
98	-40.834	-31.159	-27.377	-21.533	-21.533	-18.136	-13.737	-13.737
99	-40.781	-31.262	-27.270	-21.623	-21.623	-17.864	-14.270	-14.266
100	-40.731	-31.355	-27.173	-21.712	-21.712	-17.499	-14.653	-14.653
101	-40.680	-31.436	-27.096	-21.782	-21.782	-17.099	-15.016	-15.016
102	-40.629	-31.502	-27.043	-21.827	-21.827	-16.360	-16.383	-14.324
103	-40.578	-31.565	-26.989	-22.249	-21.434	-16.400	-16.400	-14.293
104	-40.531	-31.636	-26.895	-22.684	-20.972	-16.569	-16.575	-13.874
105	-40.520	-31.650	-26.880	-22.740	-20.910	-16.600	-16.600	-13.820
106	-40.482	-31.696	-26.823	-22.912	-20.724	-16.706	-16.696	-13.471
107	-40.433	-31.749	-26.769	-23.062	-20.561	-16.800	-16.805	-12.532
108	-40.382	-31.796	-26.724	-23.204	-20.335	-17.642	-15.980	-12.703
109	-40.330	-31.839	-26.687	-23.329	-20.047	-18.214	-14.661	-14.680
110	-40.275	-31.875	-26.675	-23.385	-19.954	-18.338	-14.629	-14.608
111	-40.217	-31.906	-26.677	-23.414	-19.937	-18.371	-14.621	-14.621
112	-40.157	-31.935	-26.689	-23.430	-19.948	-18.379	-14.631	-14.631
113	-40.096	-31.960	-26.708	-23.437	-19.986	-18.357	-14.674	-14.638
114	-40.032	-31.984	-26.733	-23.437	-20.035	-18.325	-14.686	-14.686
115	-39.966	-32.007	-26.761	-23.435	-20.089	-18.291	-14.717	-14.717
116	-39.899	-32.028	-26.791	-23.436	-20.126	-18.282	-14.727	-14.734
117	-39.830	-32.048	-26.825	-23.430	-20.191	-18.225	-15.093	-14.397
118	-39.760	-32.067	-26.861	-23.423	-20.255	-18.167	-15.279	-14.232
119	-39.689	-32.086	-26.898	-23.419	-20.312	-18.119	-15.410	-14.123
120	-39.616	-32.103	-26.934	-23.418	-20.360	-18.084	-15.506	-14.041

Table 75

FIG. 99

	Label							
	8	9	10	11	12	13	14	15
Design #								
81	-10.064	-4.016	-7.749	-7.790	-7.745	-7.783	0.710	0.600
82	-8.314	-8.314	-8.314	-8.314	-8.314	-2.668	0.000	0.000
83	-8.424	-8.424	-8.425	-8.424	-8.425	-2.035	-0.010	-0.010
84	-9.139	-9.131	-9.148	-9.133	-5.714	-1.273	-1.253	-1.255
85	-10.708	-10.711	-10.709	-7.012	-2.943	-2.947	-2.946	-2.946
86	-10.979	-11.029	-11.133	-2.350	-3.921	-3.938	-4.265	-4.066
87	-11.077	-11.070	-11.079	-4.614	-3.298	-3.771	-3.624	-3.316
88	-11.080	-11.070	-11.070	-4.470	-3.850	-3.740	-3.630	-2.900
89	-11.087	-11.083	-11.081	-4.419	-4.105	-3.440	-3.137	-3.531
90	-11.105	-11.095	-11.095	-3.757	-3.409	-3.572	-3.471	-4.449
91	-11.115	-11.118	-11.122	-3.938	-3.922	-3.779	-3.779	-3.260
92	-12.114	-12.134	-7.676	-5.315	-5.314	-5.318	-0.787	-0.790
93	-13.127	-13.129	-5.948	-5.949	-5.948	-5.948	-0.345	-0.320
94	-13.052	-11.799	-5.914	-5.916	-5.916	-5.916	-1.319	0.426
95	-13.248	-11.225	-5.983	-5.983	-5.982	-5.983	-0.233	-0.148
96	-13.446	-10.590	-6.363	-6.363	-6.363	-5.062	-0.001	-0.001
97	-13.580	-6.575	-10.100	-6.574	-4.630	-6.577	0.002	0.000
98	-13.731	-8.188	-8.183	-8.185	-5.489	-2.226	-2.219	-2.231
99	-12.752	-8.255	-8.253	-8.253	-5.304	-2.266	-2.266	-2.266
100	-12.010	-8.425	-8.425	-8.425	-4.723	-2.483	-2.393	-2.393
101	-10.050	-10.047	-10.050	-5.349	-5.160	-5.018	-1.627	-0.546
102	-10.084	-10.073	-10.052	-4.892	-5.291	-5.290	-1.843	-0.211
103	-10.075	-10.081	-10.079	-5.181	-5.085	-5.214	-1.847	-0.022
104	-10.625	-10.633	-9.069	-5.233	-5.235	-5.234	-1.098	-1.100
105	-10.670	-10.640	-9.040	-5.270	-5.230	-5.180	-1.690	-0.020
106	-10.976	-10.978	-8.219	-6.210	-5.838	-3.678	-1.657	-1.383
107	-12.532	-10.313	-7.356	-7.377	-5.724	-2.519	-2.613	-1.587
108	-12.703	-9.852	-7.796	-7.617	-4.400	-4.277	-2.310	-0.288
109	-11.046	-10.598	-8.374	-6.228	-5.911	-2.886	-2.891	-0.761
110	-11.630	-9.544	-9.075	-6.528	-4.747	-4.441	-1.922	2.042
111	-11.639	-9.258	-9.417	-6.176	-5.514	-3.923	-1.628	-1.313
112	-11.636	-9.367	-9.337	-5.875	-5.869	-3.813	-1.898	-1.040
113	-11.521	-9.916	-8.843	-5.892	-5.967	-3.727	-1.210	-1.836
114	-11.349	-10.251	-8.607	-5.991	-5.990	-3.645	-1.592	-1.552
115	-10.977	-10.743	-8.400	-6.068	-6.061	-3.492	-1.877	-1.380
116	-10.870	-10.866	-8.385	-6.096	-6.093	-2.911	-2.905	-0.561
117	-10.896	-10.898	-8.337	-6.306	-5.924	-2.887	-2.924	-0.568
118	-10.944	-10.946	-8.124	-6.860	-5.436	-3.346	-2.594	-0.489
119	-10.991	-10.989	-7.699	-7.441	-5.086	-3.647	-2.493	-0.229
120	-11.297	-10.718	-7.592	-7.592	-5.023	-3.732	-2.449	-0.229

Table 76

FIG. 100

	Label							
	16	17	18	19	20	21	22	23
Design #								
81	0.645	0.697	0.666	8.351	8.351	8.355	8.360	8.348
82	0.000	0.001	2.667	8.314	8.314	8.314	8.314	8.313
83	-0.009	-0.010	2.080	8.423	8.423	8.423	8.423	8.422
84	-1.110	2.734	2.911	4.726	9.212	9.223	9.217	9.219
85	2.943	2.949	2.944	2.948	7.012	10.711	10.708	10.709
86	3.314	3.315	3.187	3.641	5.117	11.020	11.009	11.046
87	4.672	3.541	3.560	3.537	3.314	11.074	11.083	11.073
88	2.870	3.480	3.890	4.110	4.250	11.070	11.070	11.080
89	3.414	3.445	3.365	3.791	4.620	11.084	11.081	11.085
90	3.381	3.458	3.883	4.403	3.534	11.099	11.096	11.098
91	3.241	3.862	3.858	3.858	3.859	11.118	11.118	11.119
92	-0.794	2.871	5.049	5.048	5.062	8.046	12.065	12.058
93	-0.342	1.023	5.944	5.943	5.943	5.941	11.537	13.123
94	0.432	0.426	5.927	5.927	5.928	5.928	11.755	13.064
95	-0.134	0.518	5.981	5.982	5.982	5.982	11.228	13.247
96	0.001	0.001	5.059	6.361	6.366	6.366	10.589	13.446
97	-0.002	0.000	4.630	6.569	6.570	6.586	10.100	13.580
98	2.256	2.211	2.210	5.488	8.196	8.184	8.177	13.741
99	2.266	2.266	2.266	5.305	8.254	8.254	8.254	12.753
100	2.412	2.423	2.433	4.725	8.424	8.424	8.427	12.010
101	0.292	1.989	4.607	5.235	5.585	10.018	10.058	10.061
102	0.199	1.862	4.857	5.294	5.316	10.059	10.067	10.082
103	0.027	1.840	5.158	5.161	5.163	10.081	10.077	10.076
104	0.507	1.769	5.187	5.185	5.194	9.676	9.674	11.026
105	0.020	1.690	5.210	5.230	5.240	9.040	10.650	10.660
106	1.491	1.542	3.681	6.008	6.031	8.239	11.040	10.907
107	1.618	2.523	2.564	5.792	7.592	7.091	10.313	12.546
108	0.281	2.326	4.252	4.414	7.640	7.776	9.850	12.681
109	1.329	1.578	3.802	5.883	5.951	10.149	11.333	8.689
110	-0.655	0.583	4.770	4.332	6.606	9.687	8.910	11.611
111	1.225	1.746	3.838	5.773	5.960	9.394	9.297	11.633
112	1.917	1.027	3.804	5.827	5.920	9.356	9.346	11.637
113	1.236	1.801	3.741	5.929	5.922	8.854	9.904	11.524
114	1.564	1.580	3.645	6.016	5.964	8.608	10.249	11.350
115	1.608	1.607	3.559	5.819	6.299	8.379	10.867	10.860
116	0.588	2.629	3.173	6.054	6.117	8.394	10.870	10.863
117	0.566	2.894	2.920	5.893	6.340	8.330	10.898	10.898
118	0.521	2.446	3.520	5.319	6.968	8.070	10.908	10.993
119	0.235	2.468	3.679	5.067	7.472	7.673	10.990	10.989
120	0.226	2.460	3.717	5.033	7.568	7.612	10.729	11.285

Table 77

FIG. 101

	Label							
	24	25	26	27	28	29	30	31
Design #								
81	16.864	16.864	16.864	16.864	23.655	28.775	28.775	41.821
82	16.904	16.904	16.906	16.906	23.491	28.848	28.848	41.760
83	14.802	17.628	17.628	17.628	23.011	28.960	28.960	41.699
84	13.339	17.988	17.988	17.988	22.564	29.051	29.051	41.639
85	10.707	18.208	18.205	18.205	22.235	29.119	29.119	41.579
86	11.056	15.550	20.962	19.857	19.813	29.201	29.201	41.521
87	11.074	15.370	20.252	20.248	20.251	29.236	29.236	41.459
88	11.090	15.360	20.250	20.250	20.250	29.230	29.230	41.470
89	11.082	15.382	20.261	20.261	20.260	29.263	29.263	41.393
90	11.101	15.368	20.277	20.278	20.278	29.287	29.287	41.326
91	11.113	15.342	20.298	20.298	20.299	29.310	29.310	41.255
92	12.054	14.489	20.380	20.379	20.380	28.682	29.941	41.186
93	13.123	13.122	20.437	20.437	20.437	28.357	30.267	41.122
94	13.060	13.065	20.466	20.466	20.467	28.173	30.465	41.060
95	13.247	13.247	19.415	20.987	20.986	27.922	30.688	41.000
96	13.445	13.446	18.826	21.251	21.251	27.690	30.884	40.942
97	13.580	13.580	18.464	21.408	21.408	27.518	31.034	40.887
98	13.732	13.732	18.136	21.534	21.533	27.377	31.159	40.834
99	14.267	14.269	17.864	21.623	21.623	27.270	31.262	40.781
100	14.653	14.653	17.499	21.712	21.712	27.173	31.355	40.731
101	15.019	15.019	17.095	21.783	21.782	27.095	31.436	40.680
102	14.325	16.399	16.342	21.827	21.827	27.043	31.502	40.629
103	14.293	16.400	16.400	21.434	22.249	26.989	31.565	40.578
104	13.899	16.562	16.562	20.987	22.674	26.897	31.635	40.530
105	13.820	16.600	16.600	20.910	22.740	26.880	31.650	40.520
106	13.473	16.699	16.702	20.724	22.912	26.823	31.696	40.482
107	12.517	16.811	16.794	20.560	23.062	26.769	31.749	40.433
108	12.727	15.977	17.644	20.334	23.205	26.724	31.796	40.382
109	14.629	14.688	18.227	20.039	23.331	26.686	31.839	40.330
110	14.610	14.629	18.338	19.954	23.385	26.675	31.875	40.275
111	14.628	14.617	18.369	19.939	23.413	26.678	31.906	40.217
112	14.629	14.632	18.379	19.947	23.430	26.689	31.935	40.158
113	14.658	14.654	18.357	19.986	23.437	26.708	31.960	40.096
114	14.686	14.686	18.325	20.035	23.437	26.733	31.984	40.032
115	14.716	14.719	18.290	20.089	23.435	26.761	32.007	39.966
116	14.734	14.728	18.280	20.126	23.436	26.791	32.028	39.899
117	14.392	15.097	18.224	20.191	23.429	26.825	32.048	39.830
118	14.220	15.290	18.164	20.256	23.423	26.861	32.067	39.760
119	14.124	15.410	18.119	20.312	23.419	26.898	32.086	39.689
120	14.045	15.504	18.085	20.360	23.418	26.934	32.103	39.616

Table 78

FIG. 102

	Label							
	0	1	2	3	4	5	6	7
Design #								
121	-39.542	-32.120	-26.971	-23.419	-20.406	-18.051	-15.604	-13.944
122	-39.530	-32.120	-26.980	-23.420	-20.410	-18.050	-15.620	-13.930
123	-39.467	-32.136	-27.007	-23.423	-20.446	-18.027	-15.684	-13.860
124	-39.390	-32.151	-27.044	-23.431	-20.479	-18.015	-15.738	-13.811
125	-39.312	-32.165	-27.080	-23.442	-20.509	-18.011	-15.782	-13.773
126	-39.233	-32.177	-27.115	-23.457	-20.535	-18.015	-15.810	-13.761
127	-39.152	-32.188	-27.151	-23.475	-20.558	-18.026	-15.831	-13.764
128	-39.070	-32.198	-27.186	-23.496	-20.579	-18.041	-15.846	-13.776
129	-38.986	-32.206	-27.221	-23.519	-20.600	-18.059	-15.859	-13.792
130	-38.901	-32.212	-27.256	-23.544	-20.620	-18.079	-15.871	-13.810
131	-38.814	-32.217	-27.292	-23.572	-20.641	-18.100	-15.884	-13.828
132	-38.725	-32.219	-27.326	-23.602	-20.662	-18.122	-15.897	-13.847
133	-38.635	-32.220	-27.361	-23.633	-20.684	-18.145	-15.912	-13.865
134	-38.544	-32.219	-27.396	-23.666	-20.706	-18.168	-15.928	-13.883
135	-38.451	-32.216	-27.430	-23.700	-20.731	-18.192	-15.945	-13.900
136	-38.357	-32.212	-27.464	-23.736	-20.756	-18.216	-15.964	-13.918
137	-38.261	-32.205	-27.497	-23.773	-20.783	-18.241	-15.984	-13.936
138	-38.164	-32.196	-27.529	-23.812	-20.812	-18.266	-16.005	-13.955
139	-38.150	-32.190	-27.530	-23.820	-20.820	-18.270	-16.010	-13.960
140	-38.065	-32.185	-27.561	-23.851	-20.843	-18.292	-16.028	-13.974
141	-37.965	-32.172	-27.592	-23.892	-20.876	-18.319	-16.051	-13.993
142	-37.863	-32.157	-27.621	-23.933	-20.910	-18.348	-16.076	-14.014
143	-37.760	-32.140	-27.650	-23.975	-20.946	-18.377	-16.102	-14.036
144	-37.656	-32.120	-27.677	-24.017	-20.984	-18.408	-16.129	-14.058
145	-37.550	-32.099	-27.702	-24.060	-21.024	-18.441	-16.157	-14.082
146	-37.443	-32.075	-27.727	-24.104	-21.066	-18.475	-16.186	-14.107
147	-37.334	-32.049	-27.749	-24.147	-21.110	-18.511	-16.217	-14.133
148	-37.224	-32.021	-27.770	-24.190	-21.155	-18.549	-16.249	-14.161
149	-37.112	-31.990	-27.789	-24.233	-21.201	-18.589	-16.283	-14.190
150	-37.000	-31.957	-27.806	-24.276	-21.249	-18.631	-16.318	-14.220
151	-36.886	-31.923	-27.822	-24.318	-21.298	-18.676	-16.356	-14.252
152	-36.770	-31.885	-27.835	-24.359	-21.348	-18.722	-16.395	-14.286
153	-36.654	-31.846	-27.846	-24.399	-21.399	-18.771	-16.437	-14.321
154	-36.536	-31.805	-27.855	-24.438	-21.450	-18.821	-16.481	-14.359
155	-36.417	-31.761	-27.862	-24.476	-21.502	-18.873	-16.527	-14.398
156	-36.360	-31.740	-27.860	-24.490	-21.530	-18.900	-16.550	-14.420
157	-36.296	-31.715	-27.867	-24.513	-21.554	-18.927	-16.576	-14.440
158	-36.175	-31.667	-27.869	-24.548	-21.605	-18.983	-16.627	-14.484
159	-36.052	-31.617	-27.869	-24.581	-21.657	-19.039	-16.681	-14.531
160	-35.928	-31.565	-27.867	-24.613	-21.708	-19.097	-16.737	-14.581

Table 79

FIG. 103

	Label							
	8	9	10	11	12	13	14	15
Design #								
121	-11.514	-10.528	-7.664	-7.612	-4.476	-4.476	-1.815	-1.123
122	-11.550	-10.490	-7.830	-7.450	-4.490	-4.480	-1.730	-1.220
123	-11.692	-10.348	-8.097	-7.207	-4.776	-4.237	-1.668	-1.313
124	-11.793	-10.248	-8.253	-7.066	-4.948	-4.085	-1.837	-1.141
125	-11.881	-10.145	-8.428	-6.865	-5.234	-3.784	-2.185	-0.797
126	-11.924	-10.105	-8.499	-6.786	-5.342	-3.663	-2.325	-0.650
127	-11.945	-10.098	-8.526	-6.766	-5.376	-3.631	-2.364	-0.611
128	-11.955	-10.110	-8.527	-6.781	-5.367	-3.652	-2.346	-0.634
129	-11.960	-10.127	-8.523	-6.804	-5.351	-3.681	-2.320	-0.665
130	-11.964	-10.147	-8.517	-6.828	-5.335	-3.709	-2.295	-0.694
131	-11.970	-10.165	-8.515	-6.848	-5.324	-3.731	-2.277	-0.716
132	-11.977	-10.182	-8.515	-6.865	-5.318	-3.748	-2.265	-0.731
133	-11.985	-10.198	-8.518	-6.879	-5.316	-3.760	-2.259	-0.741
134	-11.996	-10.212	-8.524	-6.890	-5.317	-3.768	-2.257	-0.746
135	-12.008	-10.225	-8.531	-6.900	-5.321	-3.775	-2.257	-0.750
136	-12.021	-10.238	-8.540	-6.909	-5.326	-3.780	-2.258	-0.752
137	-12.036	-10.251	-8.550	-6.917	-5.332	-3.785	-2.261	-0.753
138	-12.051	-10.264	-8.561	-6.926	-5.339	-3.790	-2.263	-0.754
139	-12.050	-10.270	-8.560	-6.930	-5.340	-3.790	-2.260	-0.750
140	-12.067	-10.278	-8.572	-6.935	-5.346	-3.795	-2.266	-0.754
141	-12.085	-10.292	-8.584	-6.944	-5.353	-3.799	-2.270	-0.755
142	-12.103	-10.307	-8.597	-6.954	-5.361	-3.805	-2.273	-0.756
143	-12.121	-10.322	-8.610	-6.964	-5.369	-3.810	-2.276	-0.757
144	-12.141	-10.338	-8.623	-6.975	-5.377	-3.816	-2.280	-0.758
145	-12.161	-10.355	-8.637	-6.986	-5.386	-3.822	-2.284	-0.760
146	-12.182	-10.373	-8.652	-6.998	-5.395	-3.829	-2.287	-0.761
147	-12.205	-10.392	-8.668	-7.011	-5.404	-3.835	-2.291	-0.762
148	-12.228	-10.411	-8.684	-7.024	-5.414	-3.842	-2.296	-0.764
149	-12.252	-10.432	-8.701	-7.037	-5.425	-3.850	-2.300	-0.765
150	-12.278	-10.454	-8.719	-7.052	-5.436	-3.858	-2.305	-0.767
151	-12.305	-10.477	-8.738	-7.067	-5.447	-3.866	-2.310	-0.768
152	-12.334	-10.501	-8.757	-7.083	-5.460	-3.874	-2.315	-0.770
153	-12.364	-10.526	-8.778	-7.099	-5.472	-3.883	-2.320	-0.772
154	-12.396	-10.553	-8.800	-7.117	-5.486	-3.893	-2.326	-0.774
155	-12.429	-10.581	-8.823	-7.136	-5.500	-3.903	-2.332	-0.776
156	-12.450	-10.590	-8.830	-7.140	-5.510	-3.910	-2.330	-0.780
157	-12.465	-10.611	-8.848	-7.155	-5.515	-3.914	-2.338	-0.778
158	-12.503	-10.642	-8.874	-7.176	-5.531	-3.925	-2.345	-0.780
159	-12.542	-10.676	-8.902	-7.199	-5.548	-3.937	-2.352	-0.782
160	-12.585	-10.711	-8.931	-7.222	-5.567	-3.950	-2.360	-0.785

Table 80

FIG. 104

	Label							
	16	17	18	19	20	21	22	23
Design #								
121	1.123	1.815	4.476	4.476	7.632	7.643	10.529	11.513
122	1.210	1.740	4.470	4.490	7.490	7.790	10.500	11.540
123	1.486	1.475	4.503	4.505	7.296	8.017	10.382	11.668
124	1.115	1.879	4.030	5.005	7.029	8.282	10.233	11.802
125	0.797	2.183	3.787	5.231	6.868	8.426	10.146	11.880
126	0.650	2.325	3.663	5.342	6.786	8.500	10.105	11.924
127	0.611	2.364	3.631	5.376	6.766	8.526	10.098	11.945
128	0.634	2.346	3.652	5.367	6.781	8.528	10.110	11.955
129	0.665	2.320	3.681	5.351	6.804	8.523	10.127	11.960
130	0.694	2.295	3.709	5.335	6.828	8.517	10.147	11.964
131	0.716	2.277	3.731	5.324	6.848	8.515	10.165	11.970
132	0.731	2.265	3.748	5.318	6.865	8.515	10.182	11.977
133	0.741	2.259	3.760	5.316	6.879	8.518	10.198	11.985
134	0.746	2.257	3.768	5.317	6.890	8.524	10.212	11.996
135	0.750	2.257	3.775	5.321	6.900	8.531	10.225	12.008
136	0.752	2.258	3.780	5.326	6.909	8.540	10.238	12.021
137	0.753	2.261	3.785	5.332	6.917	8.550	10.251	12.036
138	0.754	2.263	3.790	5.339	6.926	8.561	10.264	12.051
139	0.750	2.260	3.790	5.340	6.930	8.560	10.270	12.050
140	0.754	2.266	3.795	5.346	6.935	8.572	10.278	12.067
141	0.755	2.270	3.799	5.353	6.944	8.584	10.292	12.085
142	0.756	2.273	3.805	5.361	6.954	8.597	10.307	12.103
143	0.757	2.276	3.810	5.369	6.964	8.610	10.322	12.121
144	0.758	2.280	3.816	5.377	6.975	8.623	10.338	12.141
145	0.760	2.284	3.822	5.386	6.986	8.637	10.355	12.161
146	0.761	2.287	3.829	5.395	6.998	8.652	10.373	12.182
147	0.762	2.291	3.835	5.404	7.011	8.668	10.392	12.205
148	0.764	2.296	3.842	5.414	7.024	8.684	10.411	12.228
149	0.765	2.300	3.850	5.425	7.037	8.701	10.432	12.252
150	0.767	2.305	3.858	5.436	7.052	8.719	10.454	12.278
151	0.768	2.310	3.866	5.447	7.067	8.738	10.477	12.305
152	0.770	2.315	3.874	5.460	7.083	8.757	10.501	12.334
153	0.772	2.320	3.883	5.472	7.099	8.778	10.526	12.364
154	0.774	2.326	3.893	5.486	7.117	8.800	10.553	12.396
155	0.776	2.332	3.903	5.500	7.136	8.823	10.581	12.429
156	0.780	2.330	3.910	5.510	7.140	8.830	10.590	12.450
157	0.778	2.338	3.914	5.515	7.155	8.848	10.611	12.465
158	0.780	2.345	3.925	5.531	7.176	8.874	10.642	12.503
159	0.782	2.352	3.937	5.548	7.199	8.902	10.676	12.542
160	0.785	2.360	3.950	5.567	7.222	8.931	10.711	12.585

Table 81

FIG. 105

	Label							
	24	25	26	27	28	29	30	31
Design #								
121	13.944	15.604	18.051	20.406	23.419	26.971	32.120	39.542
122	13.930	15.620	18.050	20.410	23.420	26.980	32.120	39.530
123	13.870	15.679	18.028	20.445	23.423	27.007	32.136	39.467
124	13.807	15.740	18.014	20.479	23.431	27.044	32.151	39.390
125	13.774	15.782	18.011	20.509	23.442	27.079	32.165	39.312
126	13.761	15.810	18.015	20.535	23.457	27.115	32.177	39.233
127	13.764	15.831	18.026	20.558	23.475	27.151	32.188	39.152
128	13.776	15.846	18.041	20.580	23.496	27.186	32.198	39.070
129	13.792	15.859	18.059	20.600	23.519	27.221	32.206	38.986
130	13.810	15.871	18.079	20.620	23.544	27.256	32.212	38.901
131	13.828	15.884	18.100	20.641	23.572	27.292	32.217	38.814
132	13.847	15.897	18.122	20.662	23.602	27.326	32.219	38.725
133	13.865	15.912	18.145	20.684	23.633	27.361	32.220	38.635
134	13.883	15.928	18.168	20.706	23.666	27.396	32.219	38.544
135	13.900	15.945	18.192	20.731	23.700	27.430	32.216	38.451
136	13.918	15.964	18.216	20.756	23.736	27.464	32.212	38.357
137	13.936	15.984	18.241	20.783	23.773	27.497	32.205	38.261
138	13.955	16.005	18.266	20.812	23.812	27.529	32.196	38.164
139	13.960	16.010	18.270	20.820	23.820	27.530	32.190	38.150
140	13.974	16.028	18.292	20.843	23.851	27.561	32.185	38.065
141	13.993	16.051	18.319	20.876	23.892	27.592	32.172	37.965
142	14.014	16.076	18.348	20.910	23.933	27.621	32.157	37.863
143	14.036	16.102	18.377	20.946	23.975	27.650	32.140	37.760
144	14.058	16.129	18.408	20.984	24.017	27.677	32.120	37.656
145	14.082	16.157	18.441	21.024	24.060	27.702	32.099	37.550
146	14.107	16.186	18.475	21.066	24.104	27.727	32.075	37.443
147	14.133	16.217	18.511	21.110	24.147	27.749	32.049	37.334
148	14.161	16.249	18.549	21.155	24.190	27.770	32.021	37.224
149	14.190	16.283	18.589	21.201	24.233	27.789	31.990	37.112
150	14.220	16.318	18.631	21.249	24.276	27.806	31.957	37.000
151	14.252	16.356	18.676	21.298	24.318	27.822	31.923	36.886
152	14.286	16.395	18.722	21.348	24.359	27.835	31.885	36.770
153	14.321	16.437	18.771	21.399	24.399	27.846	31.846	36.654
154	14.359	16.481	18.821	21.450	24.438	27.855	31.805	36.536
155	14.398	16.527	18.873	21.502	24.476	27.862	31.761	36.416
156	14.420	16.550	18.900	21.530	24.490	27.860	31.740	36.360
157	14.440	16.576	18.927	21.554	24.513	27.867	31.715	36.296
158	14.484	16.627	18.983	21.605	24.548	27.869	31.667	36.175
159	14.531	16.681	19.039	21.657	24.581	27.869	31.617	36.052
160	14.581	16.737	19.097	21.708	24.613	27.867	31.565	35.928

Table 82

FIG. 106

	Label							
	0	1	2	3	4	5	6	7
Design #								
161	-35.803	-31.511	-27.863	-24.643	-21.758	-19.156	-16.795	-14.633
162	-35.678	-31.455	-27.856	-24.671	-21.808	-19.215	-16.854	-14.688
163	-35.551	-31.397	-27.847	-24.697	-21.856	-19.275	-16.916	-14.745
164	-35.424	-31.337	-27.836	-24.721	-21.903	-19.335	-16.979	-14.805
165	-35.296	-31.275	-27.823	-24.743	-21.949	-19.394	-17.043	-14.867
166	-35.167	-31.212	-27.808	-24.763	-21.994	-19.453	-17.108	-14.932
167	-35.038	-31.147	-27.790	-24.781	-22.037	-19.512	-17.174	-14.998
168	-34.909	-31.081	-27.771	-24.797	-22.078	-19.569	-17.240	-15.065
169	-34.779	-31.014	-27.750	-24.811	-22.117	-19.626	-17.306	-15.134
170	-34.650	-30.946	-27.728	-24.823	-22.155	-19.681	-17.372	-15.203
171	-34.522	-30.877	-27.704	-24.833	-22.191	-19.735	-17.436	-15.273
172	-34.394	-30.808	-27.679	-24.842	-22.226	-19.788	-17.501	-15.342
173	-34.268	-30.739	-27.653	-24.850	-22.259	-19.839	-17.563	-15.411
174	-34.150	-30.670	-27.630	-24.860	-22.290	-19.890	-17.620	-15.480
175	-34.144	-30.671	-27.627	-24.856	-22.290	-19.888	-17.625	-15.479
176	-34.022	-30.603	-27.601	-24.862	-22.320	-19.936	-17.685	-15.546
177	-33.902	-30.537	-27.574	-24.866	-22.348	-19.982	-17.743	-15.611
178	-33.785	-30.472	-27.548	-24.870	-22.375	-20.026	-17.799	-15.673
179	-33.672	-30.409	-27.522	-24.874	-22.401	-20.069	-17.853	-15.734
180	-33.562	-30.347	-27.497	-24.877	-22.426	-20.110	-17.905	-15.793
181	-33.455	-30.288	-27.474	-24.880	-22.450	-20.149	-17.954	-15.849
182	-33.353	-30.231	-27.450	-24.883	-22.473	-20.187	-18.002	-15.903
183	-33.254	-30.176	-27.428	-24.886	-22.495	-20.223	-18.048	-15.954
184	-33.160	-30.124	-27.407	-24.889	-22.516	-20.257	-18.091	-16.003
185	-33.068	-30.073	-27.387	-24.892	-22.536	-20.290	-18.133	-16.050
186	-32.981	-30.026	-27.368	-24.895	-22.556	-20.321	-18.172	-16.094
187	-32.898	-29.980	-27.350	-24.898	-22.574	-20.351	-18.210	-16.136
188	-32.817	-29.936	-27.333	-24.901	-22.592	-20.380	-18.246	-16.176
189	-32.740	-29.894	-27.317	-24.904	-22.609	-20.407	-18.280	-16.214
190	-32.666	-29.854	-27.301	-24.906	-22.626	-20.434	-18.313	-16.250
191	-32.595	-29.816	-27.287	-24.910	-22.642	-20.459	-18.344	-16.285
192	-32.527	-29.780	-27.273	-24.913	-22.657	-20.483	-18.374	-16.318
193	-32.464	-29.746	-27.260	-24.915	-22.671	-20.505	-18.401	-16.348
194	-32.400	-29.712	-27.248	-24.918	-22.686	-20.528	-18.429	-16.379
195	-32.342	-29.681	-27.236	-24.921	-22.699	-20.548	-18.454	-16.406
196	-32.285	-29.652	-27.225	-24.924	-22.712	-20.568	-18.478	-16.433
197	-32.230	-29.623	-27.215	-24.927	-22.724	-20.587	-18.502	-16.459
198	-32.178	-29.595	-27.204	-24.929	-22.736	-20.605	-18.524	-16.483
199	-32.127	-29.568	-27.194	-24.932	-22.747	-20.623	-18.546	-16.507
200	-32.075	-29.542	-27.185	-24.935	-22.759	-20.640	-18.567	-16.530

Table 83

FIG. 107

	Label							
	8	9	10	11	12	13	14	15
Design #								
161	-12.630	-10.749	-8.963	-7.247	-5.586	-3.963	-2.368	-0.788
162	-12.678	-10.790	-8.996	-7.274	-5.606	-3.978	-2.376	-0.790
163	-12.728	-10.833	-9.032	-7.303	-5.628	-3.993	-2.386	-0.794
164	-12.782	-10.879	-9.070	-7.334	-5.652	-4.010	-2.396	-0.797
165	-12.838	-10.927	-9.111	-7.367	-5.677	-4.028	-2.406	-0.800
166	-12.897	-10.979	-9.154	-7.402	-5.704	-4.047	-2.418	-0.804
167	-12.959	-11.034	-9.201	-7.440	-5.734	-4.068	-2.430	-0.808
168	-13.023	-11.091	-9.250	-7.480	-5.765	-4.090	-2.443	-0.813
169	-13.089	-11.151	-9.302	-7.523	-5.798	-4.114	-2.458	-0.817
170	-13.157	-11.214	-9.356	-7.568	-5.834	-4.140	-2.473	-0.823
171	-13.226	-11.278	-9.413	-7.616	-5.871	-4.167	-2.489	-0.828
172	-13.295	-11.344	-9.472	-7.666	-5.911	-4.195	-2.507	-0.834
173	-13.365	-11.410	-9.532	-7.717	-5.952	-4.225	-2.525	-0.840
174	-13.430	-11.470	-9.590	-7.770	-5.990	-4.250	-2.540	-0.850
175	-13.435	-11.477	-9.593	-7.769	-5.994	-4.256	-2.543	-0.846
176	-13.503	-11.544	-9.654	-7.822	-6.037	-4.287	-2.562	-0.852
177	-13.570	-11.609	-9.714	-7.875	-6.080	-4.319	-2.582	-0.859
178	-13.636	-11.673	-9.774	-7.927	-6.122	-4.350	-2.601	-0.865
179	-13.699	-11.735	-9.832	-7.978	-6.164	-4.381	-2.620	-0.872
180	-13.760	-11.796	-9.888	-8.027	-6.204	-4.411	-2.638	-0.878
181	-13.819	-11.853	-9.942	-8.075	-6.243	-4.440	-2.656	-0.884
182	-13.875	-11.909	-9.993	-8.120	-6.281	-4.468	-2.673	-0.890
183	-13.929	-11.961	-10.043	-8.164	-6.317	-4.495	-2.690	-0.895
184	-13.980	-12.011	-10.089	-8.205	-6.351	-4.520	-2.705	-0.901
185	-14.028	-12.059	-10.134	-8.244	-6.383	-4.544	-2.720	-0.906
186	-14.074	-12.104	-10.176	-8.281	-6.413	-4.566	-2.734	-0.910
187	-14.118	-12.147	-10.216	-8.316	-6.442	-4.588	-2.747	-0.915
188	-14.160	-12.188	-10.253	-8.349	-6.469	-4.608	-2.760	-0.919
189	-14.199	-12.226	-10.289	-8.381	-6.495	-4.627	-2.771	-0.923
190	-14.237	-12.263	-10.323	-8.411	-6.520	-4.645	-2.783	-0.927
191	-14.272	-12.298	-10.355	-8.439	-6.543	-4.662	-2.793	-0.930
192	-14.306	-12.331	-10.386	-8.465	-6.565	-4.679	-2.803	-0.934
193	-14.337	-12.361	-10.414	-8.490	-6.585	-4.694	-2.812	-0.937
194	-14.369	-12.392	-10.442	-8.515	-6.605	-4.709	-2.821	-0.940
195	-14.397	-12.419	-10.467	-8.537	-6.623	-4.722	-2.830	-0.943
196	-14.424	-12.446	-10.492	-8.558	-6.640	-4.735	-2.837	-0.945
197	-14.451	-12.472	-10.516	-8.579	-6.658	-4.747	-2.845	-0.948
198	-14.476	-12.496	-10.538	-8.598	-6.673	-4.759	-2.852	-0.950
199	-14.500	-12.519	-10.560	-8.618	-6.689	-4.771	-2.860	-0.953
200	-14.524	-12.542	-10.581	-8.636	-6.704	-4.782	-2.866	-0.955

Table 84

FIG. 108

	Label							
	16	17	18	19	20	21	22	23
Design #								
161	0.788	2.368	3.963	5.586	7.247	8.963	10.749	12.630
162	0.790	2.376	3.978	5.606	7.274	8.996	10.790	12.678
163	0.794	2.386	3.993	5.628	7.303	9.032	10.833	12.728
164	0.797	2.396	4.010	5.652	7.334	9.070	10.879	12.782
165	0.800	2.406	4.028	5.677	7.367	9.111	10.927	12.838
166	0.804	2.418	4.047	5.704	7.402	9.154	10.979	12.897
167	0.808	2.430	4.068	5.734	7.440	9.201	11.034	12.959
168	0.813	2.443	4.090	5.765	7.480	9.250	11.091	13.023
169	0.817	2.458	4.114	5.798	7.523	9.302	11.151	13.089
170	0.823	2.473	4.140	5.834	7.568	9.356	11.214	13.157
171	0.828	2.489	4.167	5.871	7.616	9.413	11.278	13.226
172	0.834	2.506	4.195	5.911	7.666	9.472	11.344	13.295
173	0.840	2.525	4.225	5.952	7.717	9.532	11.410	13.365
174	0.850	2.540	4.250	5.990	7.770	9.590	11.470	13.430
175	0.846	2.543	4.256	5.994	7.769	9.593	11.477	13.435
176	0.853	2.562	4.287	6.037	7.822	9.654	11.544	13.503
177	0.859	2.582	4.319	6.080	7.875	9.714	11.609	13.570
178	0.865	2.601	4.350	6.122	7.927	9.774	11.673	13.636
179	0.872	2.620	4.381	6.164	7.978	9.832	11.735	13.699
180	0.878	2.638	4.411	6.204	8.027	9.888	11.796	13.760
181	0.884	2.656	4.440	6.244	8.075	9.942	11.853	13.819
182	0.890	2.673	4.468	6.281	8.120	9.993	11.909	13.875
183	0.896	2.690	4.495	6.317	8.164	10.043	11.961	13.929
184	0.901	2.705	4.520	6.351	8.205	10.089	12.011	13.980
185	0.906	2.720	4.544	6.383	8.244	10.134	12.059	14.028
186	0.910	2.734	4.566	6.413	8.281	10.176	12.105	14.074
187	0.915	2.747	4.588	6.442	8.316	10.216	12.147	14.118
188	0.919	2.760	4.608	6.469	8.349	10.253	12.188	14.160
189	0.923	2.771	4.627	6.495	8.381	10.289	12.226	14.199
190	0.927	2.783	4.645	6.520	8.411	10.323	12.263	14.237
191	0.930	2.793	4.662	6.543	8.439	10.355	12.298	14.272
192	0.934	2.803	4.679	6.565	8.466	10.386	12.331	14.306
193	0.937	2.812	4.694	6.585	8.490	10.414	12.361	14.337
194	0.940	2.821	4.709	6.605	8.515	10.442	12.392	14.369
195	0.943	2.830	4.722	6.623	8.537	10.467	12.419	14.397
196	0.945	2.837	4.735	6.640	8.558	10.492	12.446	14.424
197	0.948	2.845	4.747	6.658	8.579	10.516	12.472	14.451
198	0.950	2.852	4.759	6.673	8.598	10.538	12.496	14.476
199	0.953	2.860	4.771	6.689	8.618	10.560	12.519	14.500
200	0.955	2.866	4.782	6.704	8.636	10.580	12.542	14.524

Table 85

FIG. 109

	Label							
	24	25	26	27	28	29	30	31
Design #								
161	14.633	16.795	19.156	21.758	24.643	27.863	31.511	35.803
162	14.688	16.854	19.215	21.808	24.671	27.856	31.455	35.678
163	14.745	16.916	19.275	21.856	24.697	27.847	31.397	35.551
164	14.805	16.979	19.335	21.903	24.721	27.836	31.337	35.424
165	14.867	17.043	19.394	21.949	24.743	27.823	31.275	35.296
166	14.932	17.108	19.453	21.994	24.763	27.808	31.212	35.167
167	14.998	17.174	19.512	22.037	24.781	27.790	31.147	35.038
168	15.065	17.240	19.569	22.078	24.797	27.771	31.081	34.909
169	15.134	17.306	19.626	22.117	24.811	27.750	31.014	34.779
170	15.203	17.372	19.681	22.155	24.823	27.728	30.946	34.650
171	15.273	17.436	19.735	22.191	24.833	27.704	30.877	34.522
172	15.342	17.501	19.788	22.226	24.842	27.679	30.808	34.394
173	15.411	17.563	19.839	22.259	24.850	27.653	30.739	34.268
174	15.480	17.620	19.890	22.290	24.860	27.630	30.670	34.150
175	15.479	17.625	19.888	22.290	24.856	27.627	30.671	34.144
176	15.546	17.685	19.936	22.320	24.862	27.601	30.603	34.022
177	15.611	17.743	19.982	22.348	24.866	27.574	30.537	33.902
178	15.673	17.799	20.026	22.375	24.870	27.548	30.472	33.785
179	15.734	17.853	20.069	22.401	24.874	27.522	30.409	33.672
180	15.793	17.905	20.110	22.426	24.877	27.497	30.347	33.562
181	15.849	17.954	20.149	22.450	24.880	27.473	30.288	33.455
182	15.903	18.002	20.187	22.473	24.883	27.450	30.231	33.353
183	15.954	18.048	20.223	22.495	24.886	27.428	30.176	33.254
184	16.003	18.091	20.257	22.516	24.889	27.407	30.124	33.160
185	16.050	18.133	20.290	22.536	24.892	27.387	30.073	33.068
186	16.094	18.172	20.321	22.556	24.895	27.368	30.025	32.981
187	16.136	18.210	20.351	22.574	24.898	27.350	29.980	32.898
188	16.176	18.246	20.380	22.592	24.901	27.333	29.936	32.817
189	16.214	18.280	20.407	22.609	24.904	27.317	29.894	32.740
190	16.250	18.313	20.434	22.626	24.906	27.301	29.854	32.666
191	16.285	18.344	20.459	22.642	24.910	27.287	29.816	32.595
192	16.318	18.374	20.483	22.657	24.913	27.273	29.780	32.527
193	16.348	18.401	20.505	22.671	24.915	27.260	29.746	32.464
194	16.379	18.429	20.528	22.686	24.918	27.248	29.712	32.400
195	16.406	18.454	20.548	22.699	24.921	27.236	29.681	32.342
196	16.433	18.478	20.568	22.712	24.924	27.225	29.652	32.285
197	16.459	18.502	20.587	22.724	24.927	27.215	29.623	32.230
198	16.483	18.524	20.605	22.736	24.929	27.204	29.595	32.178
199	16.507	18.546	20.623	22.747	24.932	27.194	29.568	32.127
200	16.530	18.567	20.640	22.759	24.935	27.185	29.542	32.075

Table 86

FIG. 110

	Label							
	0	1	2	3	4	5	6	7
Design #								
201	-32.030	-29.518	-27.177	-24.937	-22.770	-20.656	-18.586	-16.551
202	-31.991	-29.497	-27.169	-24.939	-22.778	-20.670	-18.603	-16.570
203	-31.943	-29.472	-27.160	-24.941	-22.788	-20.686	-18.623	-16.592
204	-31.897	-29.450	-27.153	-24.944	-22.799	-20.701	-18.641	-16.611
205	-31.863	-29.431	-27.146	-24.946	-22.808	-20.714	-18.656	-16.627
206	-31.831	-29.416	-27.141	-24.948	-22.814	-20.724	-18.668	-16.641
207	-31.803	-29.401	-27.135	-24.950	-22.821	-20.734	-18.681	-16.654
208	-31.800	-29.402	-27.142	-24.960	-22.834	-20.749	-18.697	-16.670
209	-31.732	-29.365	-27.122	-24.953	-22.836	-20.757	-18.709	-16.686
210	-31.670	-29.332	-27.107	-24.951	-22.843	-20.771	-18.727	-16.706
211	-31.644	-29.307	-27.086	-24.937	-22.838	-20.774	-18.735	-16.718
212	-31.640	-29.319	-27.107	-24.959	-22.856	-20.788	-18.746	-16.727

Table 87

FIG. 111

	Label							
	8	9	10	11	12	13	14	15
Design #								
201	-14.545	-12.563	-10.599	-8.652	-6.717	-4.791	-2.872	-0.957
202	-14.564	-12.581	-10.617	-8.667	-6.730	-4.801	-2.878	-0.959
203	-14.587	-12.603	-10.637	-8.684	-6.743	-4.811	-2.884	-0.961
204	-14.606	-12.622	-10.655	-8.701	-6.757	-4.821	-2.891	-0.963
205	-14.622	-12.637	-10.668	-8.712	-6.766	-4.827	-2.894	-0.964
206	-14.637	-12.652	-10.681	-8.723	-6.775	-4.834	-2.899	-0.966
207	-14.650	-12.664	-10.692	-8.733	-6.784	-4.841	-2.902	-0.967
208	-14.664	-12.676	-10.701	-8.737	-6.783	-4.835	-2.893	-0.954
209	-14.683	-12.696	-10.722	-8.759	-6.804	-4.856	-2.912	-0.970
210	-14.704	-12.716	-10.741	-8.776	-6.819	-4.868	-2.922	-0.978
211	-14.717	-12.731	-10.757	-8.793	-6.836	-4.884	-2.936	-0.990
212	-14.724	-12.735	-10.758	-8.790	-6.830	-4.875	-2.923	-0.974

Table 88

FIG. 112

	Label							
	16	17	18	19	20	21	22	23
Design #								
201	0.957	2.872	4.791	6.717	8.652	10.599	12.563	14.545
202	0.959	2.878	4.801	6.730	8.667	10.617	12.581	14.564
203	0.961	2.884	4.811	6.743	8.684	10.637	12.603	14.587
204	0.963	2.891	4.821	6.757	8.701	10.655	12.622	14.606
205	0.964	2.894	4.827	6.766	8.712	10.668	12.637	14.622
206	0.966	2.899	4.834	6.775	8.723	10.681	12.652	14.637
207	0.967	2.902	4.841	6.784	8.733	10.692	12.664	14.650
208	0.984	2.922	4.862	6.807	8.758	10.718	12.689	14.674
209	0.970	2.912	4.856	6.804	8.759	10.722	12.696	14.683
210	0.966	2.910	4.857	6.808	8.765	10.729	12.704	14.692
211	0.956	2.904	4.855	6.809	8.769	10.735	12.712	14.701
212	0.974	2.923	4.875	6.830	8.790	10.758	12.735	14.724

Table 89

FIG. 113

	Label							
	24	25	26	27	28	29	30	31
Design #								
201	16.551	18.586	20.656	22.770	24.937	27.177	29.518	32.030
202	16.570	18.603	20.670	22.778	24.939	27.169	29.497	31.991
203	16.592	18.623	20.686	22.788	24.941	27.160	29.472	31.943
204	16.611	18.641	20.701	22.799	24.945	27.153	29.450	31.897
205	16.627	18.656	20.714	22.808	24.946	27.146	29.431	31.863
206	16.641	18.668	20.724	22.814	24.948	27.141	29.416	31.831
207	16.654	18.681	20.734	22.821	24.950	27.135	29.401	31.803
208	16.676	18.699	20.746	22.825	24.943	27.113	29.357	31.723
209	16.686	18.709	20.757	22.836	24.953	27.122	29.365	31.732
210	16.697	18.720	20.768	22.845	24.959	27.124	29.362	31.726
211	16.706	18.729	20.775	22.850	24.962	27.127	29.366	31.729
212	16.727	18.746	20.788	22.856	24.959	27.107	29.318	31.639

Table 90

FIG. 114

Design #	SNRs	5.00%	15.00%	30.00%	45.00%	60.00%	100.00%
1	-5	0.87	0.74	0.63	0.53	0.41	0
2	-4.8	1.02	0.78	0.67	0.57	0.43	0
3	-4.6	0.86	0.73	0.62	0.53	0.45	0
4	-4.4	0.76	0.65	0.55	0.47	0.4	0
5	-4.2	1.03	0.88	0.75	0.63	0.54	0
6	-4	1	0.85	0.72	0.61	0.52	0
7	-3.8	1.18	0.9	0.77	0.65	0.55	0
8	-3.6	1.14	0.97	0.83	0.7	0.6	0
9	-3.4	1.19	1.01	0.86	0.73	0.62	0
10	-3.2	1.41	1.2	1.02	0.87	0.66	0
11	-3	1.33	1.13	0.96	0.81	0.62	0
12	-2.8	1.49	1.14	0.97	0.82	0.63	0
13	-2.6	1.43	1.22	1.03	0.88	0.75	0
14	-2.4	1.74	1.48	1.26	1.07	0.91	0
15	-2.2	1.44	1.23	1.04	0.89	0.75	0
16	-2	1.45	1.23	1.05	0.89	0.76	0
17	-1.8	1.81	1.54	1.31	1.11	0.85	0
18	-1.6	1.87	1.59	1.35	1.15	0.88	0
19	-1.4	1.82	1.55	1.32	1.12	0.95	0
20	-1.2	2.01	1.7	1.45	1.23	1.05	0
21	-1	2.01	1.71	1.45	1.23	0.94	0
22	-0.8	2.03	1.73	1.47	1.25	1.06	0
23	-0.6	2.04	1.73	1.47	1.25	1.06	0
24	-0.4	2.27	1.93	1.64	1.39	1.18	0
25	-0.2	2.26	1.93	1.64	1.39	1.06	0
26	0	2.27	1.93	1.64	1.39	1.18	0
27	0	2.27	1.93	1.64	1.39	1.18	0
28	0.2	2.29	1.95	1.66	1.41	1.2	0
29	0.4	2.83	2.4	2.04	1.74	1.48	0
30	0.6	2.55	2.16	1.84	1.56	1.33	0
31	0.8	2.54	2.16	1.84	1.56	1.19	0
32	1	3.26	2.77	2.35	2	1.53	0
33	1.2	3.29	2.79	2.37	2.02	1.72	0
34	1.4	3.3	2.8	2.38	2.02	1.55	0
35	1.6	2.97	2.53	2.15	1.83	1.55	0
36	1.8	3.31	2.82	2.39	2.03	1.73	0
37	2	3.69	3.13	2.66	2.26	1.73	0
38	2.2	3.69	2.83	2.4	2.04	1.74	0
39	2.4	3.84	3.26	2.77	2.36	1.8	0
40	2.6	3.89	3.31	2.81	2.39	1.83	0

Table 91

FIG. 115

Design #	SNRs	5.00%	15.00%	30.00%	45.00%	60.00%	100.00%
41	2.8	3.51	2.98	2.53	2.15	1.65	0
42	3	3.49	2.97	2.52	2.15	1.64	0
43	3.2	3.86	3.28	2.79	2.37	1.63	0
44	3.4	3.48	2.96	2.51	2.14	1.63	0
45	3.6	3.48	2.96	2.51	2.14	1.63	0
46	3.8	3.48	2.96	2.51	2.14	1.64	0
47	4	3.63	3.08	2.62	2.23	1.7	0
48	4.2	3.67	3.12	2.65	2.25	1.72	0
49	4.4	3.5	2.98	2.53	2.15	1.65	0
50	4.6	3.45	2.94	2.5	2.12	1.62	0
51	4.78	3.72	3.16	2.68	2.28	1.75	0
52	4.8	3.64	3.1	2.63	2.24	1.71	0
53	5	3.42	2.9	2.47	2.1	1.6	0
54	5.2	2.82	2.4	2.04	1.73	1.47	0
55	5.4	2.27	1.93	1.64	1.4	1.19	0
56	5.6	1.77	1.5	1.28	1.08	0.92	0
57	5.8	2.71	2.31	1.96	1.67	1.42	0
58	6	2.43	2.07	1.76	1.49	1.27	0
59	6.2	3.53	3	2.55	2.17	1.66	0
60	6.4	3.58	3.04	2.58	2.2	1.68	0
61	6.6	3.8	3.23	2.74	2.33	1.78	0
62	6.8	3.87	3.29	2.8	2.38	1.64	0
63	7	3.49	2.97	2.52	2.14	1.82	0
64	7.2	3.5	2.97	2.53	2.15	1.83	0
65	7.4	3.15	2.68	2.28	1.94	1.65	0
66	7.6	3.69	3.14	2.67	2.27	1.73	0
67	7.8	3.33	2.83	2.41	2.04	1.74	0
68	8	3.75	3.19	2.71	2.3	1.76	0
69	8.2	3.77	3.2	2.72	2.32	1.59	0
70	8.4	3.55	3.02	2.57	2.18	1.85	0
71	8.48	3.56	3.02	2.57	2.18	1.86	0
72	8.6	3.54	3.01	2.56	2.17	1.66	0
73	8.8	3.54	3.01	2.56	2.17	1.66	0
74	9	3.72	3.16	2.68	2.28	1.75	0
75	9.2	3.35	2.85	2.42	2.06	1.75	0
76	9.4	3.36	2.85	2.43	2.06	1.75	0
77	9.6	3.36	2.85	2.43	2.06	1.75	0
78	9.8	3.55	3.01	2.56	2.18	1.67	0
79	10	3.56	3.03	2.57	2.19	1.67	0
80	10.2	3.57	3.04	2.58	2.19	1.68	0

Table 92

FIG. 116

Design #	SNRs	5.00%	15.00%	30.00%	45.00%	60.00%	100.00%
81	10.4	2.77	2.35	2	1.7	1.44	0
82	10.6	2.83	2.41	2.05	1.74	1.48	0
83	10.8	2.87	2.44	2.07	1.76	1.5	0
84	11	2.76	2.35	1.99	1.7	1.44	0
85	11.2	2.17	1.84	1.57	1.33	1.13	0
86	11.4	2.35	2	1.7	1.44	1.23	0
87	11.6	2.22	1.89	1.6	1.36	1.16	0
88	11.8	2.34	1.99	1.69	1.43	1.22	0
89	11.83	2.33	1.98	1.69	1.43	1.22	0
90	12	2.34	1.99	1.69	1.44	1.22	0
91	12.2	2.34	1.99	1.69	1.44	1.22	0
92	12.4	2.43	2.06	1.75	1.49	1.27	0
93	12.6	2.25	1.92	1.63	1.38	1.18	0
94	12.8	2.26	1.92	1.63	1.39	1.18	0
95	13	2.26	1.92	1.63	1.39	1.18	0
96	13.2	1.96	1.67	1.42	1.21	1.03	0
97	13.4	1.81	1.54	1.31	1.11	0.94	0
98	13.6	1.83	1.55	1.32	1.12	0.95	0
99	13.8	1.64	1.39	1.18	1	0.85	0
100	14	1.39	1.18	1.01	0.86	0.73	0
101	14.2	1.42	1.21	1.03	0.87	0.74	0
102	14.4	1.44	1.23	1.04	0.89	0.75	0
103	14.6	1.44	1.22	1.04	0.88	0.75	0
104	14.8	1.45	1.23	1.04	0.89	0.75	0
105	15	1.31	1.12	0.95	0.81	0.69	0
106	15.05	1.29	1.09	0.93	0.79	0.67	0
107	15.2	0.93	0.79	0.67	0.57	0.48	0
108	15.4	0.98	0.83	0.71	0.6	0.51	0
109	15.6	0.79	0.67	0.57	0.48	0.41	0
110	15.8	0.84	0.72	0.61	0.52	0.44	0
111	16	0.84	0.71	0.61	0.52	0.44	0
112	16.2	0.85	0.72	0.61	0.52	0.44	0
113	16.4	0.85	0.72	0.61	0.52	0.44	0
114	16.6	0.85	0.72	0.61	0.52	0.44	0
115	16.8	0.85	0.72	0.61	0.52	0.44	0
116	17	0.85	0.72	0.62	0.52	0.45	0
117	17.2	0.85	0.72	0.62	0.52	0.44	0
118	17.4	0.74	0.63	0.54	0.45	0.39	0
119	17.6	0.75	0.64	0.54	0.46	0.39	0
120	17.8	0.79	0.67	0.57	0.49	0.41	0

Table 93

FIG. 117

Design #	SNRs	5.00%	15.00%	30.00%	45.00%	60.00%	100.00%
121	18	0.7	0.6	0.51	0.43	0.37	0
122	18.2	0.74	0.63	0.54	0.46	0.39	0
123	18.23	0.67	0.57	0.49	0.41	0.35	0
124	18.4	0.69	0.59	0.5	0.43	0.36	0
125	18.6	0.72	0.61	0.52	0.44	0.37	0
126	18.8	0.75	0.64	0.54	0.46	0.39	0
127	19	0.79	0.67	0.57	0.48	0.41	0
128	19.2	0.82	0.7	0.6	0.51	0.43	0
129	19.4	0.86	0.73	0.62	0.53	0.45	0
130	19.6	0.89	0.76	0.65	0.55	0.47	0
131	19.8	0.93	0.79	0.67	0.57	0.48	0
132	20	0.96	0.82	0.7	0.59	0.5	0
133	20.2	1	0.85	0.72	0.61	0.52	0
134	20.4	1.03	0.88	0.75	0.63	0.54	0
135	20.6	1.07	0.91	0.77	0.65	0.56	0
136	20.8	0.99	0.84	0.71	0.61	0.52	0
137	21	1.14	0.97	0.82	0.7	0.52	0
138	21.2	1.07	0.91	0.77	0.65	0.56	0
139	21.4	1	0.85	0.72	0.61	0.52	0
140	21.42	1	0.85	0.73	0.62	0.52	0
141	21.6	1.04	0.88	0.75	0.64	0.49	0
142	21.8	0.97	0.83	0.7	0.6	0.51	0
143	22	1.01	0.86	0.73	0.62	0.47	0
144	22.2	0.94	0.8	0.68	0.58	0.44	0
145	22.4	0.87	0.74	0.63	0.54	0.41	0
146	22.6	0.9	0.77	0.65	0.55	0.42	0
147	22.8	0.84	0.71	0.61	0.52	0.44	0
148	23	0.78	0.66	0.56	0.48	0.41	0
149	23.2	0.8	0.68	0.58	0.49	0.38	0
150	23.4	0.74	0.63	0.54	0.46	0.35	0
151	23.6	0.76	0.65	0.55	0.47	0.36	0
152	23.8	0.7	0.6	0.51	0.43	0.37	0
153	24	0.65	0.55	0.47	0.4	0.34	0
154	24.2	0.66	0.56	0.48	0.41	0.31	0
155	24.4	0.61	0.52	0.44	0.38	0.29	0
156	24.6	0.56	0.48	0.41	0.35	0.26	0
157	24.69	0.57	0.48	0.41	0.35	0.3	0
158	24.8	0.58	0.49	0.42	0.36	0.27	0
159	25	0.54	0.45	0.39	0.33	0.28	0
160	25.2	0.49	0.42	0.36	0.3	0.26	0

Table 94

FIG. 118

Design #	SNRs	5.00%	15.00%	30.00%	45.00%	60.00%	100.00%
161	25.4	0.51	0.43	0.37	0.31	0.26	0
162	25.6	0.47	0.4	0.34	0.29	0.24	0
163	25.8	0.48	0.41	0.35	0.29	0.22	0
164	26	0.44	0.37	0.32	0.27	0.23	0
165	26.2	0.41	0.34	0.29	0.25	0.21	0
166	26.4	0.41	0.35	0.3	0.25	0.21	0
167	26.6	0.4	0.34	0.29	0.24	0.19	0
168	26.8	0.35	0.3	0.25	0.21	0.18	0
169	27	0.34	0.29	0.24	0.21	0.18	0
170	27.2	0.32	0.28	0.23	0.2	0.17	0
171	27.4	0.31	0.27	0.23	0.19	0.16	0
172	27.6	0.27	0.23	0.2	0.17	0.14	0
173	27.8	0.26	0.22	0.19	0.16	0.14	0
174	28	0.25	0.21	0.18	0.15	0.13	0
175	28.19	0.24	0.2	0.17	0.15	0.13	0
176	28.2	0.24	0.2	0.17	0.15	0.13	0
177	28.4	0.23	0.2	0.17	0.14	0.12	0
178	28.6	0.22	0.19	0.16	0.14	0.12	0
179	28.8	0.21	0.18	0.15	0.13	0.11	0
180	29	0.2	0.17	0.15	0.12	0.1	0
181	29.2	0.17	0.15	0.13	0.11	0.09	0
182	29.4	0.17	0.14	0.12	0.1	0.09	0
183	29.6	0.16	0.14	0.12	0.1	0.08	0
184	29.8	0.15	0.13	0.11	0.09	0.08	0
185	30	0.15	0.12	0.11	0.09	0.08	0
186	30.2	0.14	0.12	0.1	0.09	0.07	0
187	30.4	0.13	0.11	0.1	0.08	0.07	0
188	30.6	0.13	0.11	0.09	0.08	0.07	0
189	30.8	0.12	0.1	0.09	0.07	0.06	0
190	31	0.12	0.1	0.08	0.07	0.05	0
191	31.2	0.1	0.08	0.07	0.06	0.05	0
192	31.4	0.1	0.08	0.07	0.06	0.05	0
193	31.6	0.09	0.08	0.07	0.06	0.05	0
194	31.8	0.09	0.07	0.06	0.05	0.05	0
195	32	0.08	0.07	0.06	0.05	0.04	0
196	32.2	0.08	0.07	0.06	0.05	0.04	0
197	32.4	0.08	0.07	0.06	0.05	0.04	0
198	32.6	0.07	0.06	0.05	0.04	0.04	0
199	32.8	0.07	0.06	0.05	0.04	0.04	0
200	33	0.07	0.06	0.05	0.04	0.03	0

Table 95

FIG. 119

Design #	SNRs	5.00%	15.00%	30.00%	45.00%	60.00%	100.00%
201	33.2	0.06	0.05	0.05	0.04	0.03	0
202	33.4	0.06	0.05	0.04	0.04	0.03	0
203	33.6	0.06	0.05	0.04	0.04	0.03	0
204	33.8	0.06	0.05	0.04	0.03	0.03	0
205	34	0.05	0.04	0.04	0.03	0.03	0
206	34.2	0.05	0.04	0.04	0.03	0.03	0
207	34.4	0.05	0.04	0.04	0.03	0.03	0
208	34.6	0.05	0.04	0.03	0.03	0.02	0
209	34.8	0.05	0.04	0.03	0.03	0.02	0
210	35	0.04	0.04	0.03	0.03	0.02	0
211	35.2	0.04	0.04	0.03	0.03	0.02	0
212	35.4	0.04	0.03	0.03	0.02	0.02	0
213	35.6	0.04	0.03	0.03	0.02	0.02	0

Table 96

FIG. 120

	SNR	Opt. Cap	Std. Cap	Gain [bits]	Gain %
Design #					
1	-5.0000	0.1977	0.1571	0.0407	25.9021
2	-4.8000	0.2058	0.1637	0.0420	25.6676
3	-4.6000	0.2141	0.1707	0.0434	25.4273
4	-4.4000	0.2227	0.1779	0.0448	25.1813
5	-4.2000	0.2316	0.1854	0.0462	24.9291
6	-4.0000	0.2407	0.1931	0.0476	24.6715
7	-3.8000	0.2502	0.2011	0.0491	24.4072
8	-3.6000	0.2600	0.2094	0.0505	24.1364
9	-3.4000	0.2700	0.2180	0.0520	23.8588
10	-3.2000	0.2804	0.2269	0.0535	23.5744
11	-3.0000	0.2910	0.2361	0.0550	23.2828
12	-2.8000	0.3020	0.2456	0.0564	22.9836
13	-2.6000	0.3133	0.2554	0.0579	22.6764
14	-2.4000	0.3248	0.2655	0.0594	22.3611
15	-2.2000	0.3367	0.2759	0.0608	22.0374
16	-2.0000	0.3489	0.2867	0.0622	21.7045
17	-1.8000	0.3613	0.2977	0.0636	21.3620
18	-1.6000	0.3741	0.3092	0.0650	21.0097
19	-1.4000	0.3872	0.3209	0.0663	20.6467
20	-1.2000	0.4005	0.3330	0.0675	20.2727
21	-1.0000	0.4141	0.3454	0.0687	19.8868
22	-0.8000	0.4280	0.3582	0.0698	19.4885
23	-0.6000	0.4421	0.3713	0.0708	19.0766
24	-0.4000	0.4565	0.3847	0.0718	18.6515
25	-0.2000	0.4711	0.3985	0.0726	18.2112
26	0.0000	0.4859	0.4127	0.0733	17.7556
27	0.1871	0.5	0.4262	0.0738	17.3143
28	0.2000	0.5010	0.4272	0.0738	17.2830
29	0.4000	0.5162	0.4420	0.0742	16.7935
30	0.6000	0.5316	0.4571	0.0744	16.2853
31	0.8000	0.5471	0.4726	0.0745	15.7577
32	1.0000	0.5628	0.4885	0.0743	15.2096
33	1.2000	0.5786	0.5047	0.0739	14.6402
34	1.4000	0.5944	0.5212	0.0732	14.0480
35	1.6000	0.6104	0.5380	0.0724	13.4584
36	1.8000	0.6270	0.5552	0.0718	12.9362
37	2.0000	0.6442	0.5727	0.0715	12.4812
38	2.2000	0.6619	0.5905	0.0714	12.0896
39	2.4000	0.6802	0.6087	0.0716	11.7577
40	2.6000	0.6991	0.6271	0.0720	11.4812

Table 97

FIG. 121

	SNR	Opt. Cap	Std. Cap	Gain [bits]	Gain %
Design #					
41	2.8000	0.7186	0.6459	0.0727	11.2561
42	3.0000	0.7386	0.6650	0.0737	11.0780
43	3.2000	0.7593	0.6844	0.0749	10.9425
44	3.4000	0.7804	0.7041	0.0764	10.8448
45	3.6000	0.8021	0.7241	0.0781	10.7804
46	3.8000	0.8243	0.7443	0.0800	10.7445
47	4.0000	0.8470	0.7649	0.0821	10.7322
48	4.2000	0.8702	0.7858	0.0844	10.7388
49	4.4000	0.8938	0.8070	0.0868	10.7590
50	4.6000	0.9178	0.8284	0.0894	10.7882
51	4.8000	0.9421	0.8501	0.0920	10.8216
52	5.0000	0.9668	0.8721	0.0947	10.8545
53	5.2000	0.9917	0.8944	0.0973	10.8828
54	5.2657	1.0000	0.9018	0.0982	10.8905
55	5.4000	1.0169	0.9170	0.1000	10.9024
56	5.6000	1.0423	0.9398	0.1025	10.9096
57	5.8000	1.0678	0.9628	0.1050	10.9012
58	6.0000	1.0934	0.9862	0.1072	10.8741
59	6.2000	1.1191	1.0098	0.1093	10.8262
60	6.4000	1.1448	1.0336	0.1112	10.7558
61	6.6000	1.1704	1.0577	0.1128	10.6614
62	6.8000	1.1960	1.0820	0.1141	10.5429
63	7.0000	1.2210	1.1065	0.1145	10.3491
64	7.2000	1.2477	1.1312	0.1164	10.2925
65	7.4000	1.2747	1.1562	0.1185	10.2474
66	7.6000	1.3026	1.1814	0.1212	10.2619
67	7.8000	1.3306	1.2067	0.1239	10.2665
68	8.0000	1.3587	1.2323	0.1264	10.2601
69	8.2000	1.3869	1.2580	0.1288	10.2420
70	8.4000	1.4150	1.2839	0.1311	10.2121
71	8.6000	1.4432	1.3100	0.1332	10.1702
72	8.8000	1.4714	1.3362	0.1352	10.1178
73	8.9903	1.4984	1.3613	0.1371	10.0694
74	9.0000	1.4999	1.3626	0.1373	10.0734
75	9.2000	1.5300	1.3892	0.1409	10.1412
76	9.4000	1.5600	1.4159	0.1442	10.1840
77	9.6000	1.5899	1.4427	0.1472	10.2025
78	9.8000	1.6195	1.4697	0.1499	10.1975
79	10.0000	1.6491	1.4968	0.1523	10.1750
80	10.2000	1.6796	1.5240	0.1555	10.2052

Table 98

FIG. 122

	SNR	Opt. Cap	Std. Cap	Gain [bits]	Gain %
Design #					
81	10.4000	1.7104	1.5514	0.1590	10.2461
82	10.6000	1.7413	1.5790	0.1623	10.2771
83	10.8000	1.7721	1.6067	0.1654	10.2967
84	11.0000	1.8037	1.6345	0.1692	10.3523
85	11.2000	1.8362	1.6625	0.1737	10.4487
86	11.4000	1.8686	1.6906	0.1779	10.5249
87	11.6000	1.9009	1.7189	0.1819	10.5824
88	11.8000	1.9330	1.7474	0.1856	10.6235
89	12.0000	1.9652	1.7760	0.1892	10.6515
90	12.2000	1.9974	1.8048	0.1926	10.6705
91	12.2081	1.9987	1.8060	0.1927	10.6711
92	12.4000	2.0297	1.8338	0.1959	10.6843
93	12.6000	2.0621	1.8629	0.1993	10.6962
94	12.8000	2.0947	1.8921	0.2026	10.7072
95	13.0000	2.1275	1.9215	0.2059	10.7170
96	13.2000	2.1604	1.9511	0.2093	10.7247
97	13.4000	2.1934	1.9808	0.2125	10.7283
98	13.6000	2.2264	2.0107	0.2157	10.7258
99	13.8000	2.2594	2.0407	0.2187	10.7156
100	14.0000	2.2924	2.0709	0.2215	10.6966
101	14.2000	2.3253	2.1011	0.2242	10.6682
102	14.4000	2.3581	2.1315	0.2266	10.6302
103	14.6000	2.3908	2.1620	0.2288	10.5831
104	14.8000	2.4234	2.1926	0.2308	10.5273
105	15.0000	2.4559	2.2233	0.2326	10.4639
106	15.2000	2.4884	2.2541	0.2343	10.3941
107	15.2711	2.4999	2.2651	0.2348	10.3676
108	15.4000	2.5207	2.2850	0.2357	10.3170
109	15.6000	2.5530	2.3160	0.2370	10.2322
110	15.8000	2.5851	2.3471	0.2380	10.1392
111	16.0000	2.6171	2.3783	0.2387	10.0379
112	16.2000	2.6489	2.4097	0.2392	9.9288
113	16.4000	2.6806	2.4411	0.2395	9.8122
114	16.6000	2.7122	2.4727	0.2396	9.6892
115	16.8000	2.7438	2.5043	0.2394	9.5605
116	17.0000	2.7756	2.5362	0.2394	9.4386
117	17.2000	2.8075	2.5682	0.2393	9.3185
118	17.4000	2.8392	2.6003	0.2389	9.1891
119	17.6000	2.8709	2.6326	0.2383	9.0518
120	17.8000	2.9025	2.6651	0.2374	8.9078

Table 99

FIG. 123

	SNR	Opt. Cap	Std. Cap	Gain [bits]	Gain %
Design #					
121	18.0000	2.9341	2.6977	0.2364	8.7621
122	18.2000	2.9657	2.7306	0.2351	8.6105
123	18.4000	2.9973	2.7637	0.2336	8.4532
124	18.4172	3.0000	2.7665	0.2335	8.4394
125	18.6000	3.0288	2.7969	0.2319	8.2922
126	18.8000	3.0605	2.8304	0.2301	8.1301
127	19.0000	3.0923	2.8640	0.2282	7.9695
128	19.2000	3.1243	2.8979	0.2264	7.8128
129	19.4000	3.1566	2.9320	0.2246	7.6606
130	19.6000	3.1891	2.9662	0.2228	7.5114
131	19.8000	3.2216	3.0007	0.2209	7.3626
132	20.0000	3.2543	3.0353	0.2189	7.2125
133	20.2000	3.2870	3.0701	0.2169	7.0633
134	20.4000	3.3197	3.1051	0.2146	6.9116
135	20.6000	3.3523	3.1402	0.2121	6.7543
136	20.8000	3.3847	3.1754	0.2093	6.5913
137	21.0000	3.4170	3.2108	0.2062	6.4231
138	21.2000	3.4491	3.2462	0.2029	6.2502
139	21.4000	3.4811	3.2817	0.1993	6.0734
140	21.5191	3.5000	3.3029	0.1971	5.9667
141	21.6000	3.5128	3.3173	0.1955	5.8936
142	21.8000	3.5445	3.3530	0.1915	5.7115
143	22.0000	3.5760	3.3887	0.1873	5.5275
144	22.2000	3.6073	3.4244	0.1829	5.3421
145	22.4000	3.6385	3.4601	0.1784	5.1557
146	22.6000	3.6695	3.4958	0.1737	4.9688
147	22.8000	3.7003	3.5314	0.1689	4.7819
148	23.0000	3.7310	3.5670	0.1639	4.5957
149	23.2000	3.7615	3.6026	0.1589	4.4107
150	23.4000	3.7919	3.6381	0.1538	4.2274
151	23.6000	3.8221	3.6734	0.1486	4.0462
152	23.8000	3.8522	3.7087	0.1434	3.8675
153	24.0000	3.8821	3.7439	0.1382	3.6919
154	24.2000	3.9119	3.7789	0.1330	3.5202
155	24.4000	3.9417	3.8138	0.1279	3.3529
156	24.6000	3.9714	3.8485	0.1228	3.1909
157	24.7934	4.0000	3.8820	0.1180	3.0401
158	24.8000	4.0010	3.8831	0.1179	3.0351
159	25.0000	4.0306	3.9175	0.1131	2.8869
160	25.2000	4.0603	3.9517	0.1086	2.7487

Table 100

FIG. 124

	SNR	Opt. Cap	Std. Cap	Gain [bits]	Gain %
Design #					
161	25.4000	4.0904	3.9858	0.1046	2.6251
162	25.6000	4.1208	4.0196	0.1012	2.5185
163	25.8000	4.1514	4.0532	0.0982	2.4225
164	26.0000	4.1820	4.0867	0.0953	2.3319
165	26.2000	4.2124	4.1199	0.0925	2.2443
166	26.4000	4.2426	4.1529	0.0896	2.1580
167	26.6000	4.2725	4.1857	0.0867	2.0723
168	26.8000	4.3021	4.2183	0.0838	1.9866
169	27.0000	4.3315	4.2507	0.0808	1.9006
170	27.2000	4.3605	4.2828	0.0777	1.8141
171	27.4000	4.3892	4.3146	0.0745	1.7273
172	27.6000	4.4175	4.3462	0.0713	1.6404
173	27.8000	4.4454	4.3774	0.0680	1.5535
174	28.0000	4.4730	4.4083	0.0647	1.4670
175	28.1991	4.5000	4.4387	0.0613	1.3817
176	28.2000	4.5001	4.4388	0.0613	1.3813
177	28.4000	4.5268	4.4689	0.0580	1.2968
178	28.6000	4.5531	4.4985	0.0546	1.2139
179	28.8000	4.5789	4.5276	0.0513	1.1330
180	29.0000	4.6042	4.5561	0.0480	1.0544
181	29.2000	4.6289	4.5840	0.0449	0.9784
182	29.4000	4.6530	4.6112	0.0417	0.9053
183	29.6000	4.6765	4.6377	0.0387	0.8352
184	29.8000	4.6993	4.6635	0.0358	0.7682
185	30.0000	4.7214	4.6883	0.0330	0.7045

Table 101

FIG. 125

	Label							
	0	1	2	3	4	5	6	7
Design #								
1	-18.468	-18.468	-18.468	-18.468	-18.466	-18.466	-18.468	-18.468
2	-18.487	-18.487	-18.464	-18.464	-18.463	-18.463	-18.464	-18.463
3	-18.502	-18.466	-18.466	-18.466	-18.466	-18.466	-18.466	-18.466
4	-18.502	-18.480	-18.480	-18.480	-18.460	-18.460	-18.463	-18.460
5	-18.513	-18.513	-18.513	-18.513	-18.443	-18.464	-18.513	-18.468
6	-18.472	-18.466	-18.466	-18.466	-18.466	-18.466	-18.466	-18.466
7	-18.510	-18.483	-18.483	-18.483	-18.466	-18.466	-18.483	-18.474
8	-18.478	-18.478	-18.472	-18.472	-18.472	-18.472	-18.472	-18.472
9	-18.494	-18.466	-18.464	-18.465	-18.464	-18.464	-18.464	-18.464
10	-18.477	-18.477	-18.475	-18.475	-18.474	-18.474	-18.475	-18.475
11	-18.489	-18.478	-18.478	-18.478	-18.475	-18.475	-18.478	-18.478
12	-18.509	-18.479	-18.465	-18.465	-18.465	-18.465	-18.465	-18.465
13	-18.540	-18.529	-18.451	-18.527	-18.451	-18.451	-18.451	-18.451
14	-18.529	-18.514	-18.459	-18.459	-18.459	-18.459	-18.459	-18.459
15	-18.506	-18.505	-18.494	-18.505	-18.444	-18.480	-18.494	-18.480
16	-18.529	-18.504	-18.461	-18.461	-18.459	-18.461	-18.461	-18.461
17	-18.471	-18.470	-18.470	-18.470	-18.470	-18.470	-18.470	-18.470
18	-18.506	-18.505	-18.468	-18.468	-18.465	-18.468	-18.468	-18.468
19	-18.476	-18.476	-18.476	-18.476	-18.476	-18.476	-18.476	-18.476
20	-18.482	-18.482	-18.482	-18.482	-18.454	-18.482	-18.482	-18.482
21	-18.474	-18.466	-18.466	-18.466	-18.466	-18.466	-18.466	-18.466
22	-18.478	-18.474	-18.474	-18.474	-18.464	-18.474	-18.474	-18.474
23	-18.524	-18.524	-18.524	-18.524	-18.524	-18.524	-18.524	-18.524
24	-18.483	-18.479	-18.479	-18.479	-18.461	-18.466	-18.479	-18.479
25	-18.496	-18.496	-18.496	-18.496	-18.496	-18.496	-18.496	-18.496
26	-18.467	-18.467	-18.467	-18.467	-18.467	-18.467	-18.467	-18.467
27	-18.474	-18.471	-18.471	-18.471	-18.471	-18.471	-18.471	-18.471
28	-18.538	-18.537	-18.537	-18.537	-18.446	-18.446	-18.446	-18.446
29	-18.499	-18.499	-18.467	-18.467	-18.466	-18.466	-18.466	-18.466
30	-18.495	-18.495	-18.495	-18.495	-18.453	-18.459	-18.486	-18.460
31	-18.494	-18.494	-18.485	-18.485	-18.485	-18.485	-18.485	-18.485
32	-18.528	-18.528	-18.528	-18.528	-18.528	-18.528	-18.528	-18.528
33	-18.488	-18.488	-18.488	-18.488	-18.488	-18.488	-18.488	-18.488
34	-18.536	-18.535	-18.464	-18.464	-18.464	-18.464	-18.464	-18.464
35	-20.584	-20.584	-20.584	-20.584	-20.584	-20.584	-20.584	-20.584
36	-21.574	-21.574	-21.574	-21.574	-21.573	-21.573	-21.574	-21.573
37	-22.222	-22.222	-22.222	-22.222	-22.220	-22.222	-22.222	-22.222
38	-22.705	-22.705	-22.704	-22.705	-22.703	-22.703	-22.703	-22.703
39	-23.088	-23.087	-23.087	-23.087	-23.087	-23.087	-23.087	-23.087
40	-23.404	-23.404	-23.404	-23.404	-23.402	-23.404	-23.404	-23.404

Table 102

FIG. 126

	Label							
	8	9	10	11	12	13	14	15
Design #								
1	-18.462	-18.463	-18.466	-18.463	-18.466	-18.466	-18.466	-18.466
2	-18.462	-18.462	-18.463	-18.463	-18.463	-18.463	-18.463	-18.463
3	-18.445	-18.455	-18.466	-18.462	-18.466	-18.466	-18.466	-18.466
4	-18.459	-18.459	-18.459	-18.459	-18.460	-18.459	-18.459	-18.459
5	-18.436	-18.438	-18.438	-18.438	-18.442	-18.442	-18.442	-18.442
6	-18.460	-18.466	-18.466	-18.466	-18.466	-18.466	-18.466	-18.466
7	-18.449	-18.450	-18.450	-18.450	-18.466	-18.450	-18.450	-18.450
8	-18.391	-18.447	-18.472	-18.472	-18.472	-18.472	-18.472	-18.472
9	-18.464	-18.464	-18.464	-18.464	-18.464	-18.464	-18.464	-18.464
10	-18.444	-18.459	-18.459	-18.459	-18.459	-18.459	-18.459	-18.459
11	-18.424	-18.431	-18.456	-18.450	-18.472	-18.469	-18.458	-18.468
12	-18.428	-18.463	-18.463	-18.463	-18.465	-18.465	-18.465	-18.465
13	-18.451	-18.451	-18.451	-18.451	-18.451	-18.451	-18.451	-18.451
14	-18.453	-18.459	-18.459	-18.459	-18.459	-18.459	-18.459	-18.459
15	-18.444	-18.444	-18.444	-18.444	-18.444	-18.444	-18.444	-18.444
16	-18.458	-18.458	-18.458	-18.458	-18.459	-18.459	-18.458	-18.458
17	-18.415	-18.463	-18.470	-18.469	-18.470	-18.470	-18.470	-18.470
18	-18.456	-18.456	-18.456	-18.456	-18.456	-18.456	-18.456	-18.456
19	-18.455	-18.455	-18.457	-18.457	-18.457	-18.457	-18.457	-18.457
20	-18.454	-18.454	-18.454	-18.454	-18.454	-18.454	-18.454	-18.454
21	-18.465	-18.465	-18.465	-18.465	-18.465	-18.465	-18.465	-18.465
22	-18.459	-18.459	-18.459	-18.459	-18.459	-18.459	-18.459	-18.459
23	-18.391	-18.391	-18.391	-18.391	-18.456	-18.456	-18.394	-18.394
24	-18.452	-18.457	-18.457	-18.457	-18.457	-18.457	-18.457	-18.457
25	-18.399	-18.418	-18.420	-18.420	-18.495	-18.495	-18.422	-18.426
26	-18.465	-18.465	-18.465	-18.465	-18.467	-18.465	-18.465	-18.465
27	-18.459	-18.459	-18.459	-18.459	-18.465	-18.463	-18.462	-18.462
28	-18.408	-18.445	-18.445	-18.445	-18.445	-18.445	-18.445	-18.445
29	-18.456	-18.456	-18.457	-18.456	-18.461	-18.461	-18.458	-18.459
30	-18.453	-18.453	-18.453	-18.453	-18.453	-18.453	-18.453	-18.453
31	-18.440	-18.440	-18.440	-18.440	-18.484	-18.440	-18.440	-18.440
32	-18.389	-18.389	-18.390	-18.390	-18.419	-18.419	-18.419	-18.419
33	-18.428	-18.429	-18.430	-18.429	-18.486	-18.455	-18.449	-18.449
34	-18.450	-18.450	-18.450	-18.450	-18.452	-18.450	-18.450	-18.450
35	-16.071	-16.073	-16.073	-16.073	-16.073	-16.073	-16.073	-16.073
36	-14.716	-14.716	-14.716	-14.716	-14.722	-14.722	-14.717	-14.717
37	-13.720	-13.720	-13.720	-13.720	-13.720	-13.720	-13.720	-13.720
38	-12.905	-12.905	-12.905	-12.905	-12.905	-12.905	-12.905	-12.905
39	-12.206	-12.206	-12.206	-12.206	-12.206	-12.206	-12.206	-12.206
40	-11.589	-11.589	-11.589	-11.589	-11.589	-11.589	-11.589	-11.589

Table 103

FIG. 127

	Label							
	16	17	18	19	20	21	22	23
Design #								
1	18.471	18.471	18.466	18.466	18.466	18.466	18.466	18.466
2	18.479	18.469	18.469	18.469	18.468	18.468	18.469	18.468
3	18.502	18.502	18.497	18.502	18.481	18.497	18.497	18.497
4	18.502	18.502	18.483	18.483	18.483	18.483	18.483	18.483
5	18.481	18.481	18.481	18.481	18.481	18.481	18.481	18.481
6	18.471	18.471	18.471	18.471	18.471	18.471	18.471	18.471
7	18.509	18.468	18.468	18.468	18.468	18.468	18.468	18.468
8	18.478	18.467	18.467	18.467	18.466	18.466	18.467	18.466
9	18.496	18.496	18.496	18.496	18.496	18.496	18.496	18.496
10	18.541	18.542	18.478	18.479	18.452	18.452	18.452	18.452
11	18.489	18.468	18.467	18.467	18.465	18.465	18.467	18.465
12	18.509	18.484	18.484	18.484	18.466	18.466	18.466	18.466
13	18.540	18.499	18.469	18.469	18.469	18.469	18.469	18.469
14	18.528	18.528	18.528	18.528	18.476	18.476	18.528	18.476
15	18.505	18.464	18.464	18.464	18.464	18.464	18.464	18.464
16	18.528	18.471	18.466	18.469	18.460	18.462	18.465	18.462
17	18.543	18.544	18.456	18.456	18.455	18.455	18.455	18.455
18	18.505	18.505	18.505	18.505	18.440	18.505	18.505	18.505
19	18.541	18.542	18.471	18.471	18.453	18.453	18.453	18.453
20	18.474	18.474	18.474	18.474	18.468	18.468	18.474	18.468
21	18.477	18.477	18.467	18.474	18.466	18.466	18.467	18.466
22	18.478	18.478	18.478	18.478	18.478	18.478	18.478	18.478
23	18.524	18.491	18.491	18.491	18.491	18.491	18.491	18.491
24	18.484	18.484	18.484	18.484	18.484	18.484	18.484	18.484
25	18.483	18.483	18.474	18.474	18.474	18.474	18.474	18.474
26	18.468	18.468	18.468	18.468	18.468	18.468	18.468	18.468
27	18.470	18.468	18.468	18.468	18.468	18.468	18.468	18.468
28	18.519	18.481	18.481	18.481	18.481	18.481	18.481	18.481
29	18.500	18.474	18.474	18.474	18.474	18.474	18.474	18.474
30	18.495	18.495	18.495	18.495	18.495	18.495	18.495	18.495
31	18.483	18.481	18.481	18.481	18.481	18.481	18.481	18.481
32	18.528	18.520	18.499	18.499	18.473	18.477	18.499	18.499
33	18.488	18.485	18.485	18.485	18.485	18.485	18.485	18.485
34	18.534	18.488	18.488	18.488	18.487	18.487	18.487	18.487
35	20.584	20.583	20.583	20.583	20.583	20.583	20.583	20.583
36	21.574	21.572	21.571	21.571	21.571	21.571	21.571	21.571
37	22.218	22.218	22.218	22.218	22.208	22.209	22.218	22.217
38	22.705	22.705	22.705	22.705	22.702	22.702	22.705	22.704
39	23.088	23.088	23.088	23.088	23.088	23.088	23.088	23.088
40	23.404	23.404	23.404	23.404	23.401	23.401	23.401	23.401

Table 104

FIG. 128

	Label							
	24	25	26	27	28	29	30	31
Design #								
1	18.465	18.465	18.465	18.465	18.466	18.466	18.466	18.466
2	18.452	18.463	18.463	18.463	18.468	18.464	18.463	18.463
3	18.434	18.434	18.436	18.435	18.437	18.437	18.437	18.437
4	18.410	18.410	18.445	18.410	18.483	18.483	18.445	18.472
5	18.309	18.456	18.460	18.460	18.481	18.481	18.481	18.481
6	18.438	18.445	18.466	18.453	18.471	18.471	18.471	18.471
7	18.433	18.451	18.462	18.462	18.468	18.468	18.463	18.466
8	18.464	18.464	18.464	18.464	18.465	18.465	18.464	18.464
9	18.408	18.408	18.420	18.420	18.496	18.497	18.420	18.420
10	18.452	18.452	18.452	18.452	18.452	18.452	18.452	18.452
11	18.461	18.464	18.464	18.464	18.465	18.464	18.464	18.464
12	18.453	18.453	18.455	18.453	18.455	18.455	18.455	18.455
13	18.448	18.448	18.448	18.448	18.469	18.448	18.448	18.448
14	18.404	18.417	18.418	18.418	18.476	18.419	18.418	18.418
15	18.457	18.462	18.464	18.462	18.464	18.464	18.464	18.464
16	18.458	18.460	18.460	18.460	18.460	18.460	18.460	18.460
17	18.455	18.455	18.455	18.455	18.455	18.455	18.455	18.455
18	18.421	18.432	18.437	18.437	18.439	18.439	18.439	18.439
19	18.452	18.452	18.452	18.452	18.453	18.453	18.452	18.452
20	18.455	18.455	18.455	18.455	18.467	18.467	18.466	18.467
21	18.459	18.460	18.461	18.460	18.466	18.466	18.462	18.465
22	18.426	18.432	18.432	18.432	18.478	18.478	18.478	18.478
23	18.428	18.428	18.428	18.428	18.490	18.440	18.428	18.428
24	18.415	18.418	18.429	18.419	18.484	18.483	18.472	18.473
25	18.456	18.456	18.456	18.456	18.456	18.456	18.456	18.456
26	18.465	18.465	18.465	18.465	18.465	18.465	18.465	18.465
27	18.464	18.464	18.464	18.464	18.464	18.464	18.464	18.464
28	18.437	18.437	18.453	18.437	18.453	18.453	18.453	18.453
29	18.453	18.453	18.453	18.453	18.473	18.453	18.453	18.453
30	18.427	18.438	18.438	18.438	18.445	18.438	18.438	18.438
31	18.451	18.451	18.451	18.451	18.455	18.451	18.451	18.451
32	18.428	18.428	18.429	18.428	18.451	18.437	18.429	18.434
33	18.447	18.447	18.447	18.447	18.448	18.448	18.447	18.447
34	18.439	18.439	18.439	18.439	18.440	18.439	18.439	18.439
35	16.071	16.071	16.072	16.071	16.085	16.072	16.072	16.072
36	14.720	14.720	14.720	14.720	14.720	14.720	14.720	14.720
37	13.722	13.722	13.728	13.728	13.731	13.728	13.728	13.728
38	12.905	12.905	12.905	12.905	12.905	12.905	12.905	12.905
39	12.205	12.205	12.205	12.205	12.205	12.205	12.205	12.205
40	11.590	11.590	11.590	11.590	11.590	11.590	11.590	11.590

Table 105

FIG. 129

	Label							
	0	1	2	3	4	5	6	7
Design #								
41	-23.669	-23.669	-23.669	-23.669	-23.662	-23.662	-23.665	-23.665
42	-23.892	-23.892	-23.892	-23.892	-23.891	-23.891	-23.892	-23.891
43	-24.086	-24.086	-24.086	-24.086	-24.085	-24.085	-24.086	-24.085
44	-24.254	-24.254	-24.253	-24.254	-24.245	-24.250	-24.253	-24.253
45	-24.397	-24.397	-24.397	-24.397	-24.395	-24.395	-24.397	-24.397
46	-24.525	-24.524	-24.524	-24.524	-24.524	-24.524	-24.524	-24.524
47	-24.635	-24.635	-24.635	-24.635	-24.633	-24.634	-24.635	-24.635
48	-24.738	-24.738	-24.730	-24.738	-24.727	-24.729	-24.730	-24.730
49	-24.821	-24.821	-24.816	-24.816	-24.816	-24.816	-24.816	-24.816
50	-24.897	-24.897	-24.892	-24.897	-24.890	-24.891	-24.892	-24.892
51	-24.963	-24.960	-24.960	-24.960	-24.955	-24.960	-24.960	-24.960
52	-25.024	-25.023	-25.015	-25.015	-25.015	-25.015	-25.015	-25.015
53	-25.074	-25.074	-25.074	-25.074	-25.038	-25.041	-25.061	-25.061
54	-25.083	-25.082	-25.082	-25.082	-25.078	-25.078	-25.078	-25.078
55	-25.109	-25.109	-25.108	-25.108	-25.108	-25.108	-25.108	-25.108
56	-25.148	-25.147	-25.143	-25.144	-25.143	-25.143	-25.143	-25.143
57	-25.176	-25.174	-25.174	-25.174	-25.173	-25.173	-25.173	-25.173
58	-25.202	-25.202	-25.202	-25.202	-25.189	-25.192	-25.197	-25.195
59	-25.220	-25.220	-25.215	-25.215	-25.214	-25.214	-25.215	-25.214
60	-25.238	-25.236	-25.236	-25.236	-25.226	-25.226	-25.235	-25.228
61	-25.243	-25.243	-25.243	-25.243	-25.222	-25.222	-25.233	-25.230
62	-25.243	-25.243	-25.243	-25.243	-25.243	-25.243	-25.243	-25.243
63	-24.792	-24.792	-24.792	-24.792	-24.792	-24.792	-24.792	-24.792
64	-24.737	-24.737	-24.737	-24.737	-24.737	-24.737	-24.737	-24.737
65	-38.698	-26.007	-23.569	-23.569	-21.371	-21.371	-21.371	-21.371
66	-39.014	-25.904	-23.497	-23.497	-21.322	-21.322	-21.322	-21.322
67	-39.276	-25.788	-23.433	-23.433	-21.281	-21.281	-21.281	-21.281
68	-39.422	-25.843	-23.419	-23.419	-21.222	-21.222	-21.222	-21.222
69	-39.538	-25.889	-23.430	-23.430	-21.156	-21.156	-21.156	-21.156
70	-39.608	-26.034	-23.434	-23.434	-21.077	-21.077	-21.077	-21.077
71	-39.643	-26.177	-23.477	-23.477	-20.995	-20.995	-20.995	-20.995
72	-39.643	-26.413	-23.533	-23.533	-20.878	-20.878	-20.878	-20.878
73	-31.746	-31.746	-31.746	-31.746	-14.945	-14.945	-14.945	-14.945
74	-31.751	-31.751	-31.734	-31.746	-14.948	-14.948	-14.952	-14.949
75	-31.689	-31.689	-31.688	-31.688	-15.023	-15.023	-15.024	-15.024
76	-31.638	-31.638	-31.622	-31.622	-15.108	-15.108	-15.110	-15.110
77	-31.574	-31.574	-31.564	-31.570	-15.198	-15.198	-15.201	-15.200
78	-31.554	-31.547	-31.456	-31.456	-15.296	-15.297	-15.310	-15.310
79	-38.428	-31.170	-28.865	-28.865	-14.205	-14.668	-15.742	-15.742
80	-38.361	-30.759	-28.491	-28.491	-14.105	-14.576	-15.661	-15.661

Table 106

FIG. 130

	Label							
	8	9	10	11	12	13	14	15
Design #								
41	-11.041	-11.041	-11.041	-11.041	-11.041	-11.041	-11.041	-11.041
42	-10.545	-10.545	-10.545	-10.545	-10.545	-10.545	-10.545	-10.545
43	-10.096	-10.096	-10.096	-10.096	-10.096	-10.096	-10.096	-10.096
44	-9.688	-9.688	-9.688	-9.688	-9.688	-9.688	-9.688	-9.688
45	-9.317	-9.317	-9.317	-9.317	-9.317	-9.317	-9.317	-9.317
46	-8.977	-8.977	-8.977	-8.977	-8.977	-8.977	-8.977	-8.977
47	-8.668	-8.668	-8.668	-8.668	-8.669	-8.668	-8.668	-8.668
48	-8.385	-8.385	-8.385	-8.385	-8.385	-8.385	-8.385	-8.385
49	-8.128	-8.128	-8.128	-8.128	-8.129	-8.129	-8.128	-8.129
50	-7.892	-7.892	-7.892	-7.892	-7.897	-7.896	-7.896	-7.896
51	-7.685	-7.685	-7.685	-7.685	-7.685	-7.685	-7.685	-7.685
52	-7.494	-7.496	-7.496	-7.496	-7.497	-7.497	-7.496	-7.496
53	-7.337	-7.337	-7.337	-7.337	-7.346	-7.337	-7.337	-7.337
54	-7.280	-7.280	-7.280	-7.280	-7.280	-7.280	-7.280	-7.280
55	-7.183	-7.183	-7.183	-7.183	-7.183	-7.183	-7.183	-7.183
56	-7.054	-7.054	-7.057	-7.056	-7.058	-7.058	-7.057	-7.057
57	-6.949	-6.949	-6.950	-6.950	-6.951	-6.951	-6.951	-6.951
58	-6.860	-6.860	-6.860	-6.860	-6.869	-6.866	-6.860	-6.866
59	-6.789	-6.794	-6.794	-6.794	-6.797	-6.797	-6.797	-6.797
60	-6.738	-6.739	-6.739	-6.739	-6.742	-6.742	-6.741	-6.741
61	-6.715	-6.715	-6.715	-6.715	-6.718	-6.717	-6.715	-6.715
62	-6.695	-6.696	-6.696	-6.696	-6.698	-6.698	-6.698	-6.698
63	-6.815	-6.815	-6.815	-6.815	-6.815	-6.815	-6.815	-6.815
64	-6.812	-6.812	-6.812	-6.812	-6.812	-6.812	-6.812	-6.812
65	-5.930	-6.162	-6.424	-6.424	-6.878	-6.878	-6.878	-6.878
66	-5.857	-6.089	-6.361	-6.361	-6.860	-6.860	-6.860	-6.860
67	-5.810	-6.038	-6.309	-6.309	-6.851	-6.851	-6.851	-6.851
68	-5.751	-5.969	-6.255	-6.255	-6.862	-6.862	-6.862	-6.862
69	-5.707	-5.913	-6.203	-6.203	-6.880	-6.880	-6.880	-6.880
70	-5.674	-5.865	-6.164	-6.164	-6.913	-6.913	-6.913	-6.913
71	-5.641	-5.816	-6.119	-6.119	-6.957	-6.957	-6.957	-6.957
72	-5.601	-5.760	-6.071	-6.071	-7.015	-7.015	-7.015	-7.015
73	31.747	31.747	31.746	31.746	-11.518	-11.518	-11.518	-11.518
74	31.742	31.742	31.742	31.742	-11.521	-11.521	-11.521	-11.521
75	31.700	31.700	31.674	31.677	-11.571	-11.571	-11.571	-11.571
76	31.637	31.638	31.625	31.631	-11.616	-11.616	-11.616	-11.616
77	31.574	31.574	31.564	31.570	-11.658	-11.658	-11.658	-11.658
78	31.553	31.553	31.441	31.484	-11.695	-11.695	-11.695	-11.695
79	31.181	31.181	31.181	31.181	-11.375	-11.375	-11.375	-11.375
80	38.361	30.758	28.491	28.491	-11.302	-11.302	-11.302	-11.302

Table 107

FIG. 131

	Label							
	16	17	18	19	20	21	22	23
Design #								
41	23.671	23.671	23.668	23.671	23.657	23.663	23.667	23.666
42	23.892	23.892	23.892	23.892	23.891	23.891	23.891	23.891
43	24.086	24.086	24.084	24.086	24.080	24.080	24.080	24.080
44	24.254	24.254	24.254	24.254	24.249	24.249	24.249	24.249
45	24.397	24.397	24.397	24.397	24.397	24.397	24.397	24.397
46	24.526	24.526	24.526	24.526	24.516	24.517	24.526	24.523
47	24.635	24.635	24.635	24.635	24.635	24.635	24.635	24.635
48	24.735	24.735	24.731	24.735	24.731	24.731	24.731	24.731
49	24.821	24.821	24.821	24.821	24.818	24.819	24.820	24.820
50	24.896	24.895	24.895	24.895	24.891	24.891	24.894	24.891
51	24.963	24.961	24.961	24.961	24.948	24.951	24.960	24.957
52	25.021	25.020	25.013	25.013	25.012	25.012	25.012	25.012
53	25.074	25.074	25.062	25.062	25.061	25.061	25.061	25.061
54	25.081	25.081	25.081	25.081	25.079	25.079	25.079	25.079
55	25.109	25.109	25.106	25.106	25.106	25.106	25.106	25.106
56	25.148	25.148	25.143	25.148	25.138	25.138	25.142	25.140
57	25.176	25.176	25.176	25.176	25.167	25.167	25.173	25.170
58	25.203	25.203	25.203	25.203	25.185	25.185	25.203	25.194
59	25.219	25.219	25.219	25.219	25.204	25.209	25.214	25.214
60	25.230	25.230	25.226	25.230	25.225	25.225	25.225	25.225
61	25.240	25.240	25.240	25.240	25.240	25.240	25.240	25.240
62	25.243	25.243	25.243	25.243	25.228	25.237	25.243	25.243
63	38.522	26.837	24.259	24.259	21.835	21.835	21.835	21.835
64	39.430	26.613	24.103	24.103	21.747	21.747	21.747	21.747
65	38.697	25.964	23.561	23.561	21.380	21.380	21.380	21.380
66	39.013	25.893	23.500	23.500	21.319	21.319	21.319	21.319
67	39.272	25.861	23.457	23.457	21.263	21.263	21.263	21.263
68	39.422	25.861	23.430	23.430	21.215	21.215	21.215	21.215
69	39.550	25.899	23.429	23.429	21.154	21.154	21.154	21.154
70	39.625	26.010	23.440	23.440	21.079	21.079	21.079	21.079
71	39.618	26.207	23.493	23.493	20.983	20.983	20.983	20.983
72	39.638	26.474	23.540	23.540	20.865	20.865	20.865	20.865
73	11.518	11.518	11.518	11.518	0.398	0.398	0.398	0.398
74	11.522	11.522	11.522	11.522	0.402	0.402	0.403	0.403
75	11.574	11.574	11.574	11.574	0.462	0.462	0.462	0.462
76	11.619	11.619	11.619	11.619	0.528	0.528	0.528	0.528
77	11.658	11.658	11.658	11.658	0.595	0.595	0.595	0.595
78	11.692	11.692	11.692	11.692	0.665	0.665	0.665	0.665
79	11.652	11.652	11.652	11.652	0.746	0.760	0.845	0.845
80	11.303	11.303	11.303	11.303	0.716	0.717	0.717	0.717

Table 108

FIG. 132

	Label							
	24	25	26	27	28	29	30	31
Design #								
41	11.041	11.041	11.041	11.041	11.041	11.041	11.041	11.041
42	10.545	10.545	10.545	10.545	10.545	10.545	10.545	10.545
43	10.098	10.099	10.099	10.099	10.099	10.099	10.099	10.099
44	9.688	9.688	9.688	9.688	9.688	9.688	9.688	9.688
45	9.316	9.316	9.316	9.316	9.316	9.316	9.316	9.316
46	8.978	8.978	8.978	8.978	8.978	8.978	8.978	8.978
47	8.666	8.667	8.667	8.667	8.667	8.667	8.667	8.667
48	8.385	8.385	8.385	8.385	8.385	8.385	8.385	8.385
49	8.125	8.125	8.125	8.125	8.126	8.126	8.125	8.125
50	7.893	7.894	7.894	7.894	7.894	7.894	7.894	7.894
51	7.685	7.686	7.686	7.686	7.688	7.687	7.686	7.686
52	7.498	7.498	7.498	7.498	7.501	7.499	7.499	7.499
53	7.332	7.335	7.337	7.337	7.337	7.337	7.337	7.337
54	7.280	7.280	7.280	7.280	7.280	7.280	7.280	7.280
55	7.183	7.184	7.184	7.184	7.186	7.186	7.185	7.185
56	7.054	7.058	7.058	7.058	7.059	7.059	7.059	7.059
57	6.950	6.950	6.952	6.952	6.952	6.952	6.952	6.952
58	6.863	6.863	6.863	6.863	6.864	6.863	6.863	6.863
59	6.791	6.791	6.791	6.791	6.810	6.799	6.798	6.798
60	6.745	6.745	6.745	6.745	6.746	6.746	6.745	6.745
61	6.709	6.709	6.710	6.710	6.711	6.711	6.711	6.711
62	6.693	6.700	6.700	6.700	6.702	6.702	6.700	6.700
63	5.660	5.923	6.256	6.256	6.886	6.886	6.886	6.886
64	5.576	5.836	6.181	6.181	6.844	6.844	6.844	6.844
65	5.939	6.170	6.431	6.431	6.876	6.876	6.876	6.876
66	5.863	6.093	6.361	6.361	6.862	6.862	6.862	6.862
67	5.794	6.017	6.297	6.297	6.856	6.856	6.856	6.856
68	5.748	5.965	6.249	6.249	6.865	6.865	6.865	6.865
69	5.706	5.911	6.201	6.201	6.880	6.880	6.880	6.880
70	5.673	5.865	6.161	6.161	6.912	6.912	6.912	6.912
71	5.638	5.814	6.118	6.118	6.962	6.962	6.962	6.962
72	5.598	5.755	6.066	6.066	7.014	7.014	7.014	7.014
73	14.945	14.945	14.945	14.945	-0.398	-0.398	-0.398	-0.398
74	14.947	14.947	14.947	14.947	-0.397	-0.397	-0.397	-0.397
75	15.017	15.019	15.031	15.029	-0.465	-0.465	-0.466	-0.466
76	15.103	15.103	15.107	15.104	-0.528	-0.528	-0.529	-0.528
77	15.199	15.199	15.203	15.201	-0.597	-0.597	-0.597	-0.597
78	15.293	15.293	15.322	15.314	-0.667	-0.667	-0.668	-0.667
79	15.258	15.258	15.258	15.258	-0.593	-0.593	-0.593	-0.593
80	14.104	14.575	15.660	15.660	-0.716	-0.717	-0.717	-0.717

Table 109

FIG. 133

	Label							
	0	1	2	3	4	5	6	7
Design #								
81	-38.770	-30.565	-28.305	-28.305	-14.112	-14.591	-15.728	-15.728
82	-39.045	-30.428	-28.150	-28.150	-14.151	-14.629	-15.813	-15.813
83	-39.237	-30.332	-28.008	-28.008	-14.213	-14.681	-15.922	-15.922
84	-42.842	-27.881	42.842	-25.702	29.062	-24.594	31.203	-24.594
85	-42.655	-27.882	42.853	-25.687	29.031	-24.553	31.121	-24.553
86	-42.464	-27.897	42.842	-25.674	29.001	-24.507	31.047	-24.507
87	-42.259	-27.918	42.803	-25.658	28.972	-24.450	30.979	-24.450
88	-42.044	-27.950	42.732	-25.640	28.944	-24.384	30.918	-24.384
89	-41.810	-27.996	42.639	-25.619	28.920	-24.309	30.866	-24.309
90	-41.564	-28.049	42.521	-25.594	28.899	-24.226	30.820	-24.226
91	-41.554	-28.060	42.517	-25.592	28.899	-24.218	30.819	-24.218
92	-41.313	-28.130	42.382	-25.568	28.883	-24.131	30.781	-24.131
93	-41.061	-28.204	42.235	-25.546	28.871	-24.041	30.748	-24.041
94	-40.815	-28.281	42.094	-25.529	28.867	-23.954	30.725	-23.954
95	-40.588	-28.384	41.955	-25.523	28.866	-23.867	30.704	-23.867
96	-40.382	-28.507	41.826	-25.531	28.868	-23.781	30.688	-23.781
97	-40.205	-28.658	41.701	-25.556	28.869	-23.693	30.674	-23.693
98	-40.054	-28.809	41.580	-25.607	28.865	-23.609	30.656	-23.609
99	-39.931	-28.990	41.461	-25.677	28.857	-23.523	30.638	-23.523
100	-39.837	-29.167	41.338	-25.777	28.842	-23.437	30.617	-23.437
101	-39.769	-29.347	41.210	-25.909	28.820	-23.348	30.594	-23.348
102	-39.729	-29.519	41.072	-26.092	28.790	-23.251	30.569	-23.251
103	-39.717	-29.676	40.928	-26.350	28.749	-23.144	30.538	-23.144
104	-39.740	-29.838	40.770	-26.653	28.695	-23.030	30.504	-23.030
105	-39.801	-30.016	40.599	-27.009	28.627	-22.860	30.464	-22.947
106	-39.861	-30.186	40.421	-27.323	28.552	-22.705	30.427	-22.896
107	-39.873	-30.238	40.366	-27.420	28.529	-22.658	30.421	-22.880
108	-39.892	-30.332	40.263	-27.572	28.484	-22.588	30.408	-22.856
109	-39.907	-30.471	40.107	-27.763	28.409	-22.501	30.409	-22.830
110	-39.901	-30.592	39.964	-27.911	28.334	-22.431	30.432	-22.810
111	-39.885	-30.712	39.825	-28.026	28.255	-22.368	30.473	-22.799
112	-39.845	-30.817	39.722	-28.095	28.173	-22.304	30.566	-22.787
113	-39.795	-30.919	39.633	-28.136	28.094	-22.240	30.679	-22.778
114	-39.727	-31.016	39.585	-28.134	28.013	-22.164	30.850	-22.763
115	-39.632	-31.098	39.588	-28.106	27.930	-22.083	31.071	-22.749
116	-40.170	-32.458	-24.267	-26.000	-15.469	-15.469	-18.490	-17.922
117	-40.113	-32.438	-24.253	-26.017	-15.428	-15.428	-18.613	-18.023
118	-40.042	-32.414	-24.246	-26.045	-15.378	-15.378	-18.749	-18.141
119	-39.959	-32.389	-24.245	-26.083	-15.323	-15.323	-18.892	-18.271
120	-39.866	-32.361	-24.251	-26.129	-15.266	-15.266	-19.035	-18.407

Table 110

FIG. 134

	Label							
	8	9	10	11	12	13	14	15
Design #								
81	38.770	30.564	28.304	28.304	-11.260	-11.260	-11.260	-11.260
82	39.045	30.428	28.150	28.150	-11.220	-11.220	-11.220	-11.220
83	39.236	30.328	28.011	28.011	-11.174	-11.174	-11.174	-11.174
84	-8.991	-12.436	-8.991	-12.638	-8.991	-13.018	-8.991	-13.018
85	-8.995	-12.533	-8.995	-12.741	-8.995	-13.146	-8.995	-13.146
86	-8.991	-12.638	-8.991	-12.852	-8.991	-13.286	-8.991	-13.286
87	-8.970	-12.766	-8.970	-12.985	-8.970	-13.450	-8.970	-13.450
88	-8.931	-12.915	-8.931	-13.140	-8.931	-13.637	-8.931	-13.637
89	-8.879	-13.083	-8.879	-13.313	-8.879	-13.842	-8.879	-13.842
90	-8.810	-13.271	-8.810	-13.505	-8.810	-14.064	-8.810	-14.064
91	-8.807	-13.276	-8.807	-13.512	-8.807	-14.073	-8.807	-14.073
92	-8.729	-13.463	-8.729	-13.703	-8.729	-14.290	-8.729	-14.290
93	-8.644	-13.658	-8.644	-13.899	-8.644	-14.508	-8.644	-14.508
94	-8.563	-13.841	-8.563	-14.081	-8.563	-14.707	-8.563	-14.707
95	-8.488	-13.996	-8.488	-14.234	-8.488	-14.882	-8.488	-14.882
96	-8.419	-14.121	-8.419	-14.357	-8.419	-15.032	-8.419	-15.032
97	-8.355	-14.215	-8.355	-14.447	-8.355	-15.161	-8.355	-15.161
98	-8.299	-14.289	-8.299	-14.513	-8.299	-15.273	-8.299	-15.273
99	-8.244	-14.335	-8.244	-14.548	-8.244	-15.366	-8.244	-15.366
100	-8.199	-14.363	-8.199	-14.561	-8.185	-15.447	-8.190	-15.447
101	-8.165	-14.372	-8.165	-14.551	-8.123	-15.519	-8.124	-15.519
102	-8.133	-14.360	-8.132	-14.514	-8.059	-15.585	-8.059	-15.585
103	-8.103	-14.325	-8.101	-14.448	-7.991	-15.648	-7.991	-15.648
104	-8.070	-14.265	-8.067	-14.358	-7.916	-15.702	-7.916	-15.702
105	-8.033	-14.180	-8.031	-14.237	-7.833	-15.746	-7.833	-15.746
106	-8.001	-14.102	-7.999	-14.128	-7.755	-15.782	-7.755	-15.782
107	-7.994	-14.077	-7.990	-14.094	-7.730	-15.794	-7.730	-15.794
108	-7.980	-14.038	-7.978	-14.041	-7.687	-15.814	-7.687	-15.814
109	-7.965	-13.981	-7.963	-13.981	-7.628	-15.842	-7.628	-15.842
110	-7.959	-13.935	-7.957	-13.935	-7.578	-15.871	-7.578	-15.871
111	-7.958	-13.895	-7.957	-13.895	-7.531	-15.907	-7.531	-15.892
112	-7.967	-13.861	-7.967	-13.861	-7.491	-15.947	-7.495	-15.905
113	-7.981	-13.829	-7.981	-13.829	-7.455	-15.990	-7.459	-15.920
114	-8.002	-13.795	-8.002	-13.795	-7.423	-16.030	-7.431	-15.932
115	-8.027	-13.760	-8.027	-13.760	-7.397	-16.076	-7.403	-15.949
116	40.170	32.459	24.267	26.000	-9.724	-9.724	-8.849	-8.881
117	40.113	32.438	24.253	26.016	-9.774	-9.774	-8.798	-8.827
118	40.041	32.414	24.246	26.044	-9.829	-9.829	-8.735	-8.760
119	39.958	32.388	24.245	26.081	-9.889	-9.889	-8.662	-8.682
120	39.865	32.360	24.250	26.128	-9.954	-9.954	-8.580	-8.596

Table 111

FIG. 135

	Label							
	16	17	18	19	20	21	22	23
Design #								
81	11.260	11.260	11.260	11.260	0.782	0.782	0.782	0.782
82	11.219	11.219	11.219	11.219	0.855	0.855	0.855	0.855
83	11.176	11.176	11.176	11.176	0.939	0.939	0.939	0.939
84	14.917	12.616	14.917	12.616	18.770	12.616	18.440	12.616
85	15.029	12.559	15.029	12.559	18.943	12.559	18.598	12.559
86	15.158	12.498	15.158	12.498	19.110	12.498	18.752	12.498
87	15.323	12.421	15.323	12.421	19.290	12.421	18.924	12.421
88	15.528	12.328	15.528	12.328	19.470	12.328	19.102	12.328
89	15.765	12.227	15.765	12.227	19.641	12.227	19.272	12.227
90	16.040	12.111	16.040	12.111	19.803	12.111	19.434	12.111
91	16.050	12.107	16.050	12.107	19.810	12.107	19.440	12.107
92	16.334	11.988	16.334	11.988	19.950	11.988	19.582	11.988
93	16.630	11.865	16.630	11.865	20.081	11.865	19.714	11.865
94	16.908	11.750	16.908	11.750	20.189	11.750	19.819	11.750
95	17.152	11.664	17.152	11.657	20.285	11.630	19.911	11.630
96	17.361	11.607	17.361	11.606	20.372	11.494	19.990	11.494
97	17.532	11.562	17.532	11.562	20.447	11.378	20.055	11.385
98	17.667	11.531	17.667	11.531	20.512	11.289	20.106	11.300
99	17.779	11.505	17.779	11.505	20.569	11.210	20.149	11.229
100	17.870	11.489	17.870	11.489	20.621	11.149	20.185	11.172
101	17.942	11.482	17.942	11.482	20.671	11.099	20.215	11.126
102	18.000	11.481	18.000	11.481	20.721	11.059	20.244	11.089
103	18.041	11.488	18.041	11.488	20.769	11.027	20.268	11.061
104	18.070	11.499	18.070	11.499	20.816	11.000	20.288	11.037
105	18.084	11.513	18.084	11.513	20.863	10.978	20.303	11.017
106	18.089	11.536	18.089	11.536	20.917	10.958	20.324	11.000
107	18.091	11.544	18.091	11.544	20.940	10.950	20.331	10.993
108	18.090	11.562	18.090	11.562	20.986	10.937	20.352	10.981
109	18.081	11.593	18.081	11.593	21.073	10.915	20.385	10.961
110	18.062	11.627	18.062	11.627	21.179	10.887	20.428	10.936
111	18.031	11.666	18.031	11.666	21.300	10.854	20.480	10.904
112	17.983	11.700	17.983	11.700	21.446	10.807	20.532	10.857
113	17.921	11.735	17.921	11.735	21.603	10.747	20.598	10.796
114	17.840	11.763	17.840	11.763	21.778	10.668	20.661	10.715
115	17.747	11.779	17.747	11.779	21.949	10.577	20.706	10.623
116	9.724	9.724	8.849	8.880	2.894	2.894	3.101	3.098
117	9.774	9.774	8.798	8.827	2.866	2.866	3.128	3.126
118	9.829	9.829	8.736	8.760	2.831	2.831	3.159	3.157
119	9.889	9.889	8.662	8.683	2.787	2.787	3.194	3.192
120	9.954	9.954	8.581	8.596	2.735	2.735	3.234	3.232

Table 112

FIG. 136

	Label							
	24	25	26	27	28	29	30	31
Design #								
81	14.114	14.594	15.729	15.729	-0.783	-0.783	-0.783	-0.783
82	14.152	14.629	15.814	15.814	-0.856	-0.856	-0.856	-0.856
83	14.215	14.684	15.916	15.916	-0.939	-0.939	-0.939	-0.939
84	0.734	2.397	0.734	2.397	0.504	2.397	0.515	2.397
85	0.628	2.487	0.628	2.487	0.412	2.487	0.424	2.487
86	0.514	2.585	0.514	2.585	0.316	2.585	0.329	2.585
87	0.375	2.700	0.375	2.700	0.203	2.700	0.215	2.700
88	0.211	2.836	0.211	2.836	0.069	2.836	0.082	2.836
89	0.029	2.988	0.029	2.988	-0.079	2.988	-0.067	2.988
90	-0.178	3.161	-0.178	3.161	-0.250	3.161	-0.239	3.161
91	-0.186	3.167	-0.186	3.167	-0.257	3.167	-0.246	3.167
92	-0.395	3.346	-0.395	3.346	-0.435	3.346	-0.424	3.346
93	-0.612	3.534	-0.612	3.534	-0.625	3.534	-0.614	3.534
94	-0.808	3.712	-0.808	3.712	-0.808	3.712	-0.808	3.712
95	-0.978	3.870	-0.978	3.870	-0.978	3.870	-0.978	3.870
96	-1.124	4.007	-1.124	4.007	-1.124	4.007	-1.124	4.007
97	-1.244	4.122	-1.244	4.122	-1.244	4.122	-1.244	4.122
98	-1.336	4.218	-1.336	4.218	-1.336	4.218	-1.336	4.218
99	-1.409	4.297	-1.409	4.297	-1.409	4.297	-1.409	4.297
100	-1.464	4.365	-1.464	4.365	-1.464	4.365	-1.464	4.365
101	-1.501	4.420	-1.501	4.420	-1.501	4.420	-1.501	4.420
102	-1.524	4.465	-1.524	4.465	-1.524	4.465	-1.524	4.465
103	-1.533	4.505	-1.533	4.505	-1.533	4.505	-1.533	4.505
104	-1.530	4.540	-1.530	4.540	-1.530	4.540	-1.530	4.540
105	-1.514	4.570	-1.514	4.571	-1.514	4.571	-1.514	4.571
106	-1.495	4.593	-1.495	4.593	-1.495	4.609	-1.495	4.609
107	-1.490	4.596	-1.490	4.596	-1.490	4.619	-1.490	4.618
108	-1.480	4.604	-1.480	4.604	-1.480	4.639	-1.480	4.638
109	-1.466	4.612	-1.466	4.612	-1.466	4.669	-1.466	4.666
110	-1.456	4.614	-1.456	4.614	-1.456	4.693	-1.456	4.691
111	-1.435	4.610	-1.436	4.610	-1.456	4.719	-1.456	4.716
112	-1.421	4.592	-1.422	4.592	-1.468	4.737	-1.468	4.733
113	-1.407	4.566	-1.408	4.566	-1.484	4.751	-1.484	4.748
114	-1.401	4.525	-1.401	4.525	-1.511	4.757	-1.510	4.754
115	-1.397	4.473	-1.397	4.473	-1.545	4.759	-1.545	4.753
116	15.469	15.469	18.491	17.923	-2.894	-2.894	-3.101	-3.099
117	15.428	15.428	18.613	18.023	-2.866	-2.866	-3.128	-3.126
118	15.378	15.378	18.749	18.141	-2.831	-2.831	-3.159	-3.157
119	15.324	15.324	18.891	18.272	-2.787	-2.787	-3.194	-3.192
120	15.266	15.266	19.034	18.406	-2.735	-2.735	-3.233	-3.232

Table 113

FIG. 137

	Label							
	0	1	2	3	4	5	6	7
Design #								
121	-39.738	-32.309	-24.163	-26.205	39.739	32.310	-19.642	-19.232
122	-39.649	-32.294	-24.211	-26.262	39.652	32.295	-19.652	-19.205
123	-39.536	-32.264	-24.242	-26.313	39.558	32.276	-19.673	-19.189
124	-39.535	-32.267	-24.247	-26.323	39.535	32.267	-19.676	-19.188
125	-39.425	-32.234	-24.266	-26.372	39.425	32.235	-19.705	-19.182
126	-39.280	-32.184	-24.279	-26.420	39.280	32.185	-19.748	-19.190
127	-39.115	-32.122	-24.285	-26.466	39.114	32.120	-19.802	-19.206
128	-38.948	-32.053	-24.274	-26.504	38.949	32.054	-19.853	-19.220
129	-38.784	-31.991	-24.260	-26.553	38.784	31.991	-19.906	-19.230
130	-38.640	-31.943	-24.236	-26.616	38.640	31.943	-19.954	-19.226
131	-38.523	-31.917	-24.206	-26.700	38.522	31.915	-19.999	-19.205
132	-38.424	-31.907	-24.169	-26.796	38.425	31.908	-20.038	-19.169
133	-38.432	-32.010	38.436	-27.388	-17.451	-21.330	-17.003	-22.982
134	-38.350	-32.013	38.356	-27.381	-17.487	-21.326	-16.995	-23.037
135	-38.274	-32.018	38.274	-27.382	-17.524	-21.318	-16.982	-23.104
136	-38.195	-32.021	38.202	-27.387	-17.562	-21.304	-16.961	-23.182
137	-38.121	-32.028	38.125	-27.401	-17.603	-21.285	-16.930	-23.274
138	-38.052	-32.040	38.050	-27.427	-17.643	-21.261	-16.888	-23.380
139	-37.977	-32.047	37.977	-27.455	-17.685	-21.234	-16.841	-23.485
140	-37.932	-32.052	37.936	-27.475	-17.710	-21.218	-16.811	-23.549
141	-37.904	-32.056	37.909	-27.490	-17.726	-21.207	-16.788	-23.592
142	-37.835	-32.069	37.833	-27.533	-17.771	-21.185	-16.735	-23.696
143	-37.760	-32.075	37.765	-27.574	-17.819	-21.165	-16.683	-23.789
144	-37.689	-32.084	37.687	-27.619	-17.873	-21.153	-16.633	-23.875
145	-37.610	-32.087	37.614	-27.661	-17.935	-21.147	-16.586	-23.953
146	-37.532	-32.090	37.534	-27.705	-18.009	-21.151	-16.540	-24.027
147	-37.452	-32.088	37.452	-27.746	-18.093	-21.162	-16.497	-24.094
148	-37.366	-32.082	37.368	-27.784	-18.187	-21.184	-16.457	-24.159
149	-37.280	-32.074	37.279	-27.821	-18.284	-21.215	-16.423	-24.220
150	-37.189	-32.062	37.189	-27.855	-18.380	-21.253	-16.398	-24.278
151	-37.094	-32.045	37.094	-27.885	-18.474	-21.299	-16.383	-24.334
152	-36.994	-32.023	36.996	-27.912	-18.564	-21.350	-16.383	-24.388
153	-36.891	-31.997	36.891	-27.935	-18.649	-21.405	-16.394	-24.439
154	-36.781	-31.964	36.781	-27.953	-18.731	-21.462	-16.421	-24.487
155	-36.668	-31.927	36.666	-27.965	-18.808	-21.519	-16.460	-24.531
156	-36.538	-31.876	36.541	-27.969	-18.887	-21.579	-16.517	-24.571
157	-36.412	-31.824	36.413	-27.969	-18.956	-21.631	-16.575	-24.605
158	-36.408	-31.822	36.408	-27.968	-18.959	-21.633	-16.577	-24.606
159	-36.258	-31.750	36.259	-27.953	-19.032	-21.685	-16.653	-24.631
160	-36.085	-31.658	36.082	-27.921	-19.106	-21.732	-16.740	-24.645

Table 114

FIG. 138

	Label							
	8	9	10	11	12	13	14	15
Design #								
121	-6.470	-6.470	-11.613	-11.613	-5.566	-5.562	-13.954	-14.014
122	-6.536	-6.536	-11.556	-11.556	-5.489	-5.486	-14.052	-14.129
123	-6.623	-6.623	-11.505	-11.505	-5.407	-5.404	-14.171	-14.262
124	-6.629	-6.629	-11.499	-11.499	-5.397	-5.393	-14.181	-14.273
125	-6.729	-6.729	-11.456	-11.456	-5.311	-5.308	-14.303	-14.405
126	-6.870	-6.870	-11.425	-11.425	-5.212	-5.210	-14.452	-14.563
127	-7.045	-7.045	-11.413	-11.413	-5.115	-5.114	-14.605	-14.723
128	-7.239	-7.239	-11.420	-11.420	-5.034	-5.033	-14.742	-14.866
129	-7.422	-7.422	-11.438	-11.438	-4.968	-4.967	-14.857	-14.991
130	-7.572	-7.572	-11.454	-11.454	-4.920	-4.919	-14.940	-15.088
131	-7.681	-7.681	-11.460	-11.460	-4.881	-4.880	-14.989	-15.157
132	-7.759	-7.759	-11.460	-11.460	-4.850	-4.850	-15.014	-15.205
133	-3.256	-6.122	-3.256	-6.122	-13.075	-9.682	-13.146	-9.682
134	-3.230	-6.176	-3.230	-6.176	-13.104	-9.682	-13.191	-9.682
135	-3.208	-6.216	-3.208	-6.216	-13.123	-9.681	-13.228	-9.681
136	-3.192	-6.246	-3.192	-6.246	-13.132	-9.682	-13.259	-9.677
137	-3.178	-6.265	-3.178	-6.265	-13.130	-9.680	-13.283	-9.668
138	-3.163	-6.275	-3.163	-6.275	-13.115	-9.673	-13.302	-9.654
139	-3.154	-6.283	-3.154	-6.283	-13.098	-9.670	-13.318	-9.640
140	-3.149	-6.285	-3.149	-6.286	-13.083	-9.667	-13.326	-9.630
141	-3.145	-6.285	-3.145	-6.286	-13.070	-9.664	-13.331	-9.622
142	-3.135	-6.282	-3.135	-6.286	-13.038	-9.659	-13.344	-9.602
143	-3.129	-6.279	-3.129	-6.287	-13.003	-9.657	-13.359	-9.583
144	-3.122	-6.273	-3.122	-6.287	-12.964	-9.656	-13.376	-9.561
145	-3.118	-6.266	-3.117	-6.287	-12.921	-9.658	-13.397	-9.538
146	-3.113	-6.255	-3.109	-6.285	-12.871	-9.660	-13.423	-9.510
147	-3.109	-6.242	-3.103	-6.284	-12.815	-9.664	-13.452	-9.477
148	-3.106	-6.224	-3.094	-6.282	-12.752	-9.670	-13.489	-9.438
149	-3.102	-6.203	-3.085	-6.280	-12.685	-9.677	-13.531	-9.391
150	-3.099	-6.176	-3.073	-6.278	-12.618	-9.687	-13.582	-9.338
151	-3.096	-6.143	-3.058	-6.278	-12.552	-9.703	-13.645	-9.277
152	-3.095	-6.103	-3.040	-6.280	-12.490	-9.726	-13.724	-9.209
153	-3.094	-6.054	-3.016	-6.284	-12.433	-9.759	-13.815	-9.132
154	-3.096	-5.995	-2.986	-6.293	-12.389	-9.805	-13.919	-9.050
155	-3.103	-5.925	-2.947	-6.310	-12.359	-9.868	-14.026	-8.968
156	-3.119	-5.848	-2.899	-6.346	-12.357	-9.959	-14.140	-8.897
157	-3.146	-5.767	-2.841	-6.400	-12.374	-10.067	-14.245	-8.842
158	-3.148	-5.764	-2.839	-6.402	-12.375	-10.071	-14.248	-8.841
159	-3.206	-5.686	-2.765	-6.502	-12.429	-10.216	-14.364	-8.819
160	-3.322	-5.636	-2.677	-6.667	-12.520	-10.390	-14.488	-8.853

Table 115

FIG. 139

	Label							
	16	17	18	19	20	21	22	23
Design #								
121	19.643	19.233	13.955	14.016	24.164	26.206	11.618	11.618
122	19.652	19.205	14.052	14.129	24.210	26.261	11.560	11.560
123	19.674	19.187	14.170	14.260	24.246	26.321	11.504	11.504
124	19.676	19.189	14.182	14.275	24.247	26.323	11.502	11.502
125	19.706	19.184	14.305	14.408	24.268	26.372	11.458	11.458
126	19.750	19.190	14.454	14.564	24.281	26.422	11.426	11.426
127	19.800	19.206	14.605	14.722	24.283	26.463	11.416	11.416
128	19.854	19.222	14.744	14.868	24.276	26.504	11.421	11.421
129	19.905	19.230	14.857	14.992	24.259	26.553	11.438	11.438
130	19.955	19.227	14.941	15.089	24.237	26.615	11.455	11.455
131	19.998	19.205	14.990	15.157	24.205	26.698	11.461	11.461
132	20.038	19.170	15.015	15.206	24.170	26.797	11.460	11.460
133	27.394	22.988	32.015	21.350	13.255	16.943	13.194	17.422
134	27.387	23.044	32.018	21.341	13.270	16.949	13.193	17.467
135	27.386	23.111	32.020	21.328	13.286	16.947	13.190	17.512
136	27.393	23.191	32.027	21.311	13.300	16.932	13.180	17.556
137	27.406	23.282	32.032	21.289	13.313	16.907	13.166	17.599
138	27.426	23.382	32.038	21.262	13.322	16.870	13.144	17.640
139	27.457	23.490	32.048	21.235	13.332	16.826	13.117	17.684
140	27.479	23.555	32.055	21.219	13.337	16.796	13.098	17.709
141	27.495	23.598	32.061	21.208	13.340	16.775	13.084	17.726
142	27.533	23.697	32.067	21.184	13.350	16.725	13.050	17.770
143	27.577	23.791	32.079	21.165	13.362	16.675	13.011	17.817
144	27.619	23.876	32.084	21.152	13.378	16.627	12.971	17.872
145	27.664	23.955	32.090	21.147	13.398	16.581	12.925	17.934
146	27.704	24.026	32.090	21.149	13.422	16.537	12.876	18.006
147	27.745	24.093	32.088	21.161	13.452	16.495	12.819	18.091
148	27.784	24.158	32.083	21.182	13.488	16.455	12.756	18.184
149	27.821	24.219	32.074	21.214	13.531	16.422	12.688	18.282
150	27.855	24.278	32.062	21.253	13.582	16.397	12.620	18.379
151	27.885	24.334	32.045	21.299	13.646	16.384	12.553	18.474
152	27.912	24.388	32.024	21.350	13.723	16.382	12.491	18.563
153	27.935	24.439	31.997	21.405	13.816	16.395	12.434	18.649
154	27.953	24.488	31.965	21.463	13.920	16.422	12.389	18.732
155	27.966	24.532	31.926	21.521	14.028	16.462	12.360	18.810
156	27.971	24.572	31.879	21.578	14.139	16.515	12.356	18.886
157	27.969	24.605	31.824	21.631	14.245	16.575	12.373	18.956
158	27.968	24.606	31.822	21.633	14.248	16.577	12.375	18.959
159	27.953	24.631	31.751	21.684	14.363	16.651	12.427	19.031
160	27.919	24.643	31.656	21.730	14.488	16.739	12.520	19.105

Table 116

FIG. 140

	Label							
	24	25	26	27	28	29	30	31
Design #								
121	0.241	0.241	5.559	5.557	-0.243	-0.243	6.468	6.468
122	0.299	0.299	5.486	5.482	-0.300	-0.300	6.535	6.535
123	0.369	0.369	5.397	5.395	-0.376	-0.376	6.618	6.618
124	0.379	0.379	5.393	5.389	-0.380	-0.380	6.629	6.629
125	0.462	0.462	5.306	5.303	-0.465	-0.465	6.728	6.728
126	0.579	0.579	5.208	5.207	-0.581	-0.581	6.870	6.870
127	0.724	0.724	5.115	5.113	-0.723	-0.723	7.046	7.046
128	0.881	0.881	5.031	5.030	-0.883	-0.883	7.239	7.239
129	1.033	1.033	4.967	4.966	-1.033	-1.034	7.422	7.422
130	1.159	1.159	4.918	4.917	-1.160	-1.160	7.572	7.572
131	1.255	1.255	4.881	4.880	-1.255	-1.255	7.681	7.681
132	1.326	1.326	4.849	4.849	-1.328	-1.328	7.759	7.759
133	0.172	2.924	0.172	2.924	9.485	6.389	9.485	6.389
134	0.132	2.974	0.132	2.974	9.533	6.378	9.533	6.378
135	0.102	3.014	0.102	3.014	9.568	6.370	9.569	6.370
136	0.077	3.042	0.077	3.042	9.589	6.361	9.596	6.361
137	0.059	3.064	0.059	3.064	9.602	6.353	9.615	6.353
138	0.047	3.080	0.047	3.080	9.605	6.345	9.627	6.345
139	0.035	3.089	0.035	3.089	9.603	6.335	9.634	6.335
140	0.029	3.093	0.029	3.093	9.598	6.329	9.636	6.329
141	0.026	3.094	0.026	3.094	9.593	6.324	9.637	6.323
142	0.021	3.100	0.021	3.100	9.582	6.317	9.641	6.314
143	0.015	3.101	0.015	3.101	9.566	6.309	9.642	6.301
144	0.012	3.103	0.012	3.103	9.550	6.304	9.646	6.291
145	0.008	3.101	0.008	3.102	9.528	6.298	9.650	6.278
146	0.007	3.100	0.007	3.103	9.505	6.295	9.656	6.266
147	0.005	3.095	0.004	3.102	9.474	6.291	9.662	6.250
148	0.005	3.089	0.002	3.100	9.435	6.288	9.668	6.230
149	0.006	3.081	-0.001	3.098	9.390	6.284	9.676	6.207
150	0.007	3.069	-0.004	3.095	9.336	6.281	9.687	6.179
151	0.010	3.055	-0.008	3.094	9.276	6.279	9.703	6.145
152	0.015	3.038	-0.013	3.093	9.207	6.280	9.726	6.104
153	0.022	3.014	-0.021	3.093	9.130	6.284	9.759	6.054
154	0.033	2.984	-0.033	3.094	9.048	6.293	9.805	5.994
155	0.048	2.945	-0.049	3.101	8.966	6.310	9.868	5.924
156	0.072	2.899	-0.071	3.119	8.896	6.345	9.958	5.849
157	0.106	2.841	-0.105	3.146	8.842	6.400	10.066	5.768
158	0.107	2.839	-0.106	3.148	8.840	6.402	10.071	5.765
159	0.163	2.767	-0.161	3.206	8.819	6.501	10.213	5.688
160	0.257	2.680	-0.254	3.324	8.854	6.668	10.390	5.639

Table 117

FIG. 141

	Label							
	0	1	2	3	4	5	6	7
Design #								
161	-35.860	-31.521	35.860	-27.852	-19.181	-21.766	-16.846	-24.633
162	-35.666	-31.406	35.663	-27.799	-19.246	-21.799	-16.934	-24.628
163	-35.507	-31.322	35.508	-27.769	-19.301	-21.835	-17.000	-24.637
164	-35.373	-31.256	35.373	-27.752	-19.353	-21.874	-17.056	-24.654
165	-35.247	-31.195	35.249	-27.738	-19.403	-21.913	-17.108	-24.672
166	-35.132	-31.143	35.131	-27.730	-19.453	-21.954	-17.158	-24.695
167	-35.013	-31.087	35.014	-27.719	-19.503	-21.994	-17.210	-24.716
168	-34.901	-31.036	34.902	-27.711	-19.552	-22.034	-17.260	-24.737
169	-34.790	-30.985	34.787	-27.702	-19.603	-22.074	-17.313	-24.758
170	-34.677	-30.930	34.676	-27.689	-19.652	-22.112	-17.366	-24.776
171	-34.564	-30.875	34.560	-27.677	-19.703	-22.150	-17.421	-24.793
172	-34.448	-30.817	34.449	-27.660	-19.751	-22.185	-17.476	-24.807
173	-34.335	-30.759	34.335	-27.643	-19.800	-22.220	-17.531	-24.820
174	-34.219	-30.700	34.221	-27.624	-19.848	-22.254	-17.587	-24.832
175	-34.107	-30.641	-24.843	-27.605	34.107	30.641	-22.286	-19.895
176	-34.106	-30.640	-24.843	-27.604	34.106	30.640	-22.287	-19.896
177	-33.992	-30.579	-24.851	-27.583	33.993	30.580	-22.316	-19.941
178	-33.880	-30.519	-24.858	-27.561	33.881	30.520	-22.346	-19.986
179	-33.770	-30.459	-24.864	-27.538	33.770	30.459	-22.373	-20.029
180	-33.661	-30.399	-24.870	-27.515	33.661	30.399	-22.400	-20.071
181	-33.554	-30.341	-24.875	-27.493	33.554	30.341	-22.426	-20.111
182	-33.452	-30.284	-24.878	-27.470	33.451	30.284	-22.449	-20.149
183	-33.348	-30.227	-24.881	-27.447	33.350	30.228	-22.472	-20.187
184	-33.253	-30.175	-24.886	-27.427	33.252	30.175	-22.495	-20.223
185	-33.159	-30.123	-24.888	-27.406	33.159	30.123	-22.515	-20.257

Table 118

FIG. 142

	Label							
	8	9	10	11	12	13	14	15
Design #								
161	-3.564	-5.671	-2.596	-6.941	-12.671	-10.618	-14.638	-8.985
162	-3.775	-5.733	-2.552	-7.160	-12.793	-10.792	-14.757	-9.108
163	-3.899	-5.774	-2.533	-7.290	-12.873	-10.904	-14.841	-9.183
164	-3.977	-5.800	-2.521	-7.375	-12.931	-10.982	-14.907	-9.233
165	-4.034	-5.822	-2.516	-7.440	-12.982	-11.045	-14.964	-9.274
166	-4.073	-5.837	-2.510	-7.487	-13.025	-11.095	-15.016	-9.306
167	-4.107	-5.856	-2.511	-7.531	-13.070	-11.143	-15.068	-9.339
168	-4.133	-5.872	-2.511	-7.566	-13.112	-11.187	-15.118	-9.369
169	-4.156	-5.888	-2.512	-7.600	-13.157	-11.229	-15.170	-9.401
170	-4.177	-5.908	-2.518	-7.632	-13.203	-11.272	-15.222	-9.433
171	-4.198	-5.929	-2.524	-7.666	-13.253	-11.318	-15.277	-9.470
172	-4.220	-5.953	-2.533	-7.701	-13.305	-11.366	-15.333	-9.509
173	-4.242	-5.979	-2.543	-7.737	-13.359	-11.416	-15.390	-9.551
174	-4.265	-6.008	-2.555	-7.776	-13.416	-11.468	-15.449	-9.596
175	-7.818	-9.641	-13.473	-11.523	-6.035	-4.291	-15.508	-17.643
176	-7.819	-9.642	-13.474	-11.524	-6.035	-4.291	-15.509	-17.644
177	-7.860	-9.691	-13.532	-11.579	-6.070	-4.315	-15.568	-17.698
178	-7.903	-9.742	-13.592	-11.635	-6.104	-4.339	-15.626	-17.752
179	-7.947	-9.794	-13.651	-11.692	-6.140	-4.365	-15.685	-17.805
180	-7.992	-9.846	-13.711	-11.749	-6.177	-4.392	-15.743	-17.858
181	-8.037	-9.897	-13.768	-11.804	-6.213	-4.418	-15.798	-17.908
182	-8.081	-9.947	-13.823	-11.859	-6.249	-4.445	-15.852	-17.956
183	-8.126	-9.999	-13.879	-11.914	-6.286	-4.472	-15.906	-18.004
184	-8.165	-10.044	-13.930	-11.963	-6.318	-4.496	-15.955	-18.049
185	-8.206	-10.091	-13.980	-12.013	-6.352	-4.521	-16.003	-18.091

Table 119

FIG. 143

	Label							
	16	17	18	19	20	21	22	23
Design #								
161	27.855	24.636	31.523	21.769	14.639	16.849	12.670	19.184
162	27.798	24.627	31.405	21.799	14.757	16.934	12.794	19.246
163	27.769	24.637	31.322	21.836	14.841	17.000	12.873	19.302
164	27.751	24.654	31.255	21.874	14.906	17.056	12.931	19.353
165	27.740	24.675	31.197	21.914	14.964	17.108	12.981	19.404
166	27.729	24.694	31.142	21.953	15.016	17.157	13.025	19.452
167	27.721	24.717	31.089	21.995	15.068	17.209	13.069	19.503
168	27.711	24.737	31.037	22.034	15.118	17.260	13.112	19.553
169	27.699	24.755	30.982	22.072	15.170	17.312	13.158	19.601
170	27.689	24.775	30.930	22.111	15.221	17.365	13.203	19.652
171	27.673	24.791	30.872	22.148	15.277	17.421	13.254	19.702
172	27.660	24.808	30.818	22.186	15.333	17.476	13.305	19.752
173	27.644	24.822	30.760	22.221	15.390	17.531	13.359	19.800
174	27.625	24.833	30.701	22.254	15.449	17.587	13.415	19.848
175	22.286	19.895	15.508	17.643	24.843	27.605	13.473	11.523
176	22.286	19.895	15.508	17.643	24.843	27.604	13.473	11.523
177	22.317	19.942	15.568	17.698	24.852	27.584	13.532	11.578
178	22.346	19.986	15.627	17.753	24.859	27.562	13.592	11.635
179	22.374	20.029	15.685	17.806	24.864	27.539	13.652	11.692
180	22.400	20.071	15.742	17.858	24.869	27.515	13.710	11.749
181	22.425	20.111	15.798	17.908	24.874	27.493	13.768	11.805
182	22.450	20.150	15.852	17.957	24.879	27.471	13.824	11.859
183	22.473	20.188	15.906	18.004	24.882	27.448	13.879	11.913
184	22.495	20.223	15.955	18.048	24.885	27.427	13.930	11.964
185	22.516	20.257	16.004	18.092	24.889	27.407	13.981	12.013

Table 120

FIG. 144

	Label							
	24	25	26	27	28	29	30	31
Design #								
161	0.424	2.591	-0.428	3.561	8.983	6.939	10.617	5.667
162	0.573	2.552	-0.572	3.776	9.108	7.160	10.793	5.734
163	0.655	2.532	-0.655	3.899	9.183	7.290	10.904	5.774
164	0.707	2.522	-0.706	3.977	9.233	7.376	10.982	5.801
165	0.740	2.513	-0.742	4.032	9.272	7.438	11.044	5.820
166	0.767	2.511	-0.766	4.073	9.306	7.488	11.095	5.838
167	0.784	2.509	-0.786	4.106	9.338	7.530	11.143	5.855
168	0.799	2.510	-0.799	4.133	9.369	7.566	11.186	5.871
169	0.812	2.516	-0.809	4.159	9.403	7.602	11.231	5.891
170	0.820	2.519	-0.819	4.178	9.434	7.633	11.272	5.908
171	0.829	2.527	-0.826	4.201	9.472	7.668	11.320	5.931
172	0.833	2.533	-0.834	4.220	9.509	7.701	11.366	5.953
173	0.839	2.542	-0.841	4.241	9.550	7.737	11.416	5.979
174	0.845	2.554	-0.846	4.264	9.595	7.776	11.468	6.007
175	0.855	2.563	6.035	4.291	-0.856	-2.563	7.818	9.641
176	0.856	2.564	6.036	4.292	-0.855	-2.562	7.819	9.641
177	0.859	2.577	6.069	4.314	-0.860	-2.578	7.859	9.691
178	0.864	2.593	6.104	4.339	-0.865	-2.594	7.902	9.742
179	0.869	2.610	6.140	4.365	-0.870	-2.610	7.947	9.794
180	0.875	2.627	6.177	4.392	-0.874	-2.626	7.993	9.846
181	0.880	2.643	6.213	4.419	-0.880	-2.642	8.037	9.898
182	0.885	2.658	6.248	4.444	-0.886	-2.660	8.080	9.947
183	0.890	2.675	6.285	4.471	-0.891	-2.676	8.125	9.998
184	0.896	2.691	6.319	4.496	-0.896	-2.691	8.166	10.045
185	0.900	2.705	6.352	4.520	-0.902	-2.707	8.206	10.091

Table 121

FIG. 145

Design #	SNRs	5.00%	40.00%	50.00%	60.00%	70.00%	100.00%
63	7	2.79	2.51	2.26	2.03	1.48	0
64	7.2	2.88	2.59	2.33	2.1	1.38	0
65	7.4	2.75	2.47	2.23	2	1.31	0
66	7.6	2.74	2.47	2.22	2	1.31	0
67	7.8	2.74	2.47	2.22	2	1.31	0
68	8	2.72	2.45	2.2	1.98	1.3	0
69	8.2	2.7	2.43	2.18	1.96	1.29	0
70	8.4	2.66	2.39	2.15	1.94	1.27	0
71	8.6	2.62	2.36	2.12	1.91	1.25	0
72	8.8	2.56	2.3	2.07	1.87	1.22	0
73	8.99	2.59	1.28	1.15	1.04	0.93	0
74	9	2.59	1.28	1.15	1.04	0.93	0
75	9.2	2.57	1.25	1.13	1.02	0.91	0
76	9.4	2.54	1.23	1.1	0.99	0.89	0
77	9.6	2.51	1.2	1.08	0.97	0.87	0
78	9.8	2.48	1.18	1.06	0.95	0.86	0
79	10	2.39	2.15	1.93	1.74	1.14	0
80	10.2	2.13	1.92	1.73	1.56	1.13	0
81	10.4	2.31	2.08	1.87	1.69	1.11	0
82	10.6	2.26	2.03	1.83	1.64	1.08	0
83	10.8	2.2	1.98	1.78	1.6	1.17	0
84	11	2.19	1.97	1.77	1.59	1.05	0
85	11.2	2.15	1.93	1.74	1.56	1.03	0
86	11.4	2.1	1.89	1.7	1.53	1.12	0
87	11.6	2.05	1.84	1.66	1.49	1.09	0
88	11.8	2.2	1.98	1.78	1.61	1.05	0
89	12	2.13	1.91	1.72	1.55	1.02	0
90	12.2	2.04	1.84	1.65	1.49	1.09	0
91	12.21	2.04	1.83	1.65	1.49	1.08	0
92	12.4	2.17	1.96	1.76	1.58	1.04	0
93	12.6	2.12	1.91	1.72	1.39	1.02	0
94	12.8	2.07	1.87	1.68	1.51	0.99	0
95	13	2.02	1.82	1.64	1.47	0.97	0
96	13.2	1.96	1.76	1.59	1.43	1.04	0
97	13.4	1.89	1.7	1.53	1.38	1.01	0
98	13.6	1.83	1.65	1.48	1.33	0.97	0
99	13.8	1.76	1.58	1.42	1.28	0.93	0
100	14	1.89	1.7	1.53	1.38	1	0
101	14.2	1.85	1.66	1.5	1.35	0.88	0
102	14.4	1.81	1.63	1.47	1.32	0.96	0

Table 122

FIG. 146

Design #	SNRs	5.00%	40.00%	50.00%	60.00%	70.00%	100.00%
103	14.6	1.77	1.59	1.43	1.29	0.94	0
104	14.8	1.72	1.55	1.39	1.25	0.91	0
105	15	1.86	1.67	1.5	1.35	0.89	0
106	15.2	1.81	1.63	1.47	1.32	0.87	0
107	15.27	1.8	1.62	1.46	1.32	0.86	0
108	15.4	1.79	1.61	1.45	1.17	0.86	0
109	15.6	1.58	1.43	1.28	1.15	0.84	0
110	15.8	1.72	1.55	1.4	1.26	0.82	0
111	16	1.54	1.38	1.25	1.12	0.82	0
112	16.2	1.53	1.37	1.24	1.11	0.81	0
113	16.4	1.51	1.36	1.22	1.1	0.8	0
114	16.6	1.65	1.49	1.34	1.08	0.79	0
115	16.8	1.62	1.46	1.31	1.18	0.77	0
116	17	1.57	1.41	1.27	1.14	0.75	0
117	17.2	1.55	1.39	1.25	1.02	0.74	0
118	17.4	1.52	1.37	1.23	1	0.73	0
119	17.6	1.34	1.21	1.09	0.98	0.71	0
120	17.8	1.46	1.31	1.18	1.06	0.7	0
121	18	1.27	1.14	1.03	0.92	0.67	0
122	18.2	1.36	1.22	1.1	0.99	0.65	0
123	18.4	1.31	1.18	1.06	0.95	0.63	0
124	18.42	1.3	1.17	1.05	0.95	0.62	0
125	18.6	1.25	1.12	1.01	0.91	0.66	0
126	18.8	1.3	1.17	1.05	0.95	0.56	0
127	19	1.2	1.08	0.97	0.88	0.57	0
128	19.2	1.18	1.06	0.96	0.86	0.57	0
129	19.4	1.1	0.99	0.89	0.81	0.59	0
130	19.6	1.14	1.02	0.92	0.83	0.54	0
131	19.8	1.15	1.04	0.93	0.84	0.55	0
132	20	1.04	0.94	0.84	0.76	0.55	0
133	20.2	1.03	0.93	0.84	0.75	0.49	0
134	20.4	1.05	0.94	0.85	0.69	0.5	0
135	20.6	1.05	0.95	0.85	0.69	0.5	0
136	20.8	0.95	0.86	0.77	0.69	0.51	0
137	21	0.95	0.86	0.77	0.7	0.46	0
138	21.2	0.95	0.86	0.77	0.63	0.46	0
139	21.4	0.95	0.86	0.77	0.62	0.45	0
140	21.52	0.85	0.77	0.69	0.62	0.45	0
141	21.6	0.85	0.77	0.69	0.62	0.45	0
142	21.8	0.85	0.76	0.68	0.62	0.45	0
143	22	0.78	0.71	0.64	0.57	0.42	0

Table 123

FIG. 147

Design #	SNRs	5.00%	40.00%	50.00%	60.00%	70.00%	100.00%
144	22.2	0.81	0.73	0.66	0.53	0.39	0
145	22.4	0.75	0.68	0.61	0.55	0.36	0
146	22.6	0.78	0.7	0.63	0.57	0.37	0
147	22.8	0.72	0.65	0.59	0.53	0.35	0
148	23	0.67	0.6	0.54	0.49	0.36	0
149	23.2	0.69	0.62	0.56	0.5	0.33	0
150	23.4	0.64	0.57	0.52	0.47	0.34	0
151	23.6	0.66	0.59	0.53	0.43	0.31	0
152	23.8	0.61	0.55	0.49	0.44	0.29	0
153	24	0.56	0.5	0.45	0.41	0.3	0
154	24.2	0.57	0.52	0.46	0.42	0.27	0
155	24.4	0.53	0.48	0.43	0.39	0.28	0
156	24.6	0.54	0.49	0.44	0.39	0.26	0
157	24.79	0.5	0.45	0.4	0.36	0.27	0
158	24.8	0.5	0.45	0.41	0.36	0.24	0
159	25	0.46	0.42	0.38	0.34	0.25	0
160	25.2	0.48	0.43	0.39	0.35	0.25	0
161	25.4	0.44	0.4	0.36	0.32	0.23	0
162	25.6	0.45	0.41	0.37	0.33	0.22	0
163	25.8	0.42	0.38	0.34	0.3	0.22	0
164	26	0.38	0.34	0.31	0.28	0.2	0
165	26.2	0.38	0.34	0.31	0.28	0.2	0
166	26.4	0.37	0.33	0.3	0.27	0.2	0
167	26.6	0.36	0.32	0.29	0.26	0.19	0
168	26.8	0.35	0.32	0.28	0.26	0.19	0
169	27	0.34	0.31	0.28	0.25	0.16	0
170	27.2	0.3	0.27	0.24	0.22	0.16	0
171	27.4	0.29	0.26	0.23	0.21	0.15	0
172	27.6	0.28	0.25	0.23	0.2	0.15	0
173	27.8	0.27	0.24	0.22	0.2	0.14	0
174	28	0.26	0.23	0.21	0.19	0.14	0
175	28.2	0.25	0.23	0.2	0.18	0.13	0
176	28.2	0.25	0.23	0.2	0.18	0.13	0
177	28.4	0.24	0.22	0.2	0.18	0.13	0
178	28.6	0.21	0.19	0.17	0.15	0.11	0
179	28.8	0.22	0.2	0.18	0.16	0.12	0
180	29	0.19	0.17	0.16	0.14	0.1	0
181	29.2	0.18	0.17	0.15	0.13	0.1	0
182	29.4	0.2	0.18	0.16	0.13	0.09	0
183	29.6	0.17	0.15	0.14	0.12	0.09	0
184	29.8	0.16	0.15	0.13	0.12	0.09	0
185	30	0.15	0.14	0.12	0.11	0.08	0

Table 124

FIG. 148

SYSTEMS AND METHODS FOR RECEIVING DATA TRANSMITTED USING NON-UNIFORM QAM 256 CONSTELLATIONS

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] The present invention is a continuation application of U.S. patent application Ser. No. 18/488,902 filed Oct. 17, 2023 entitled "Systems and Methods for Receiving Data Transmitted Using Non-Uniform QAM 256 Constellations", which is a continuation application of U.S. patent application Ser. No. 17/328,993 filed May 24, 2021 entitled "Methods and Apparatuses for Signaling with Geometric Constellations" and issued as U.S. Pat. No. 11,902,078 on Feb. 13, 2024, which is a continuation application of U.S. patent application Ser. No. 16/734,261 filed Jan. 3, 2020 entitled "Methods and Apparatuses for Signaling with Geometric Constellations" and issued as U.S. Pat. No. 11,018,922 on May 25, 2021, which is a continuation application of U.S. patent application Ser. No. 15/826,579 filed Nov. 29, 2017 entitled "Methods and Apparatuses for Signaling with Geometric Constellations" and issued as U.S. Pat. No. 10,530,629 on Jan. 7, 2020, which application is a continuation application of U.S. patent application Ser. No. 13/608,838 filed Sep. 10, 2012 entitled "Methods and Apparatuses for Signaling with Geometric Constellations" and issued as U.S. Pat. No. 9,887,870 on Feb. 6, 2018, which application is a continuation application of U.S. patent application Ser. No. 12/650,532 filed Dec. 30, 2009 entitled "Methods and Apparatuses for Signaling with Geometric Constellations" and issued as U.S. Pat. No. 8,265,175 on Sep. 11, 2012, which application claims priority to U.S. Provisional Application Ser. No. 61/141,662 filed Dec. 30, 2008 and U.S. Provisional Application Ser. No. 61/141,935 filed Dec. 31, 2008, both of which are entitled "PAM-8, 16, 32 Constellations Optimized for Joint and PD Capacity" and are to Barsoum et al. The disclosure of U.S. patent application Ser. Nos. 18/488,902, 17/328,993, 16/734,261, 15/826,579, 13/608,838, 12/650,532, and U.S. Provisional Application Nos. 61/141,662 and 61/141,935 are expressly incorporated by reference herein in its entirety.

STATEMENT OF FEDERALLY SPONSORED RESEARCH

[0002] This invention was made with Government support under contract NAS7-03001 awarded by NASA. The Government has certain rights in this invention.

BACKGROUND

[0003] The present invention generally relates to bandwidth and/or power efficient digital transmission systems and more specifically to the use of unequally spaced constellations having increased capacity.

[0004] The term "constellation" is used to describe the possible symbols that can be transmitted by a typical digital communication system. A receiver attempts to detect the symbols that were transmitted by mapping a received signal to the constellation. The minimum distance (d_{min}) between constellation points is indicative of the capacity of a constellation at high signal-to-noise ratios (SNRs). Therefore, constellations used in many communication systems are designed to maximize d_{min}. Increasing the dimensionality of a constellation allows larger minimum distance for constant constellation energy per dimension. Therefore, a number of multi-dimensional constellations with good minimum distance properties have been designed.

[0005] Communication systems have a theoretical maximum capacity, which is known as the Shannon limit. Many communication systems attempt to use codes to increase the capacity of a communication channel. Significant coding gains have been achieved using coding techniques such as turbo codes and LDPC codes. The coding gains achievable using any coding technique are limited by the constellation of the communication system. The Shannon limit can be thought of as being based upon a theoretical constellation known as a Gaussian distribution, which is an infinite constellation where symbols at the center of the constellation are transmitted more frequently than symbols at the edge of the constellation. Practical constellations are finite and transmit symbols with equal likelihoods, and therefore have capacities that are less than the Gaussian capacity. The capacity of a constellation is thought to represent a limit on the gains that can be achieved using coding when using that constellation.

[0006] Prior attempts have been made to develop unequally spaced constellations. For example, a system has been proposed that uses unequally spaced constellations that are optimized to minimize the error rate of an uncoded system. Another proposed system uses a constellation with equiprobable but unequally spaced symbols in an attempt to mimic a Gaussian distribution.

[0007] Other approaches increase the dimensionality of a constellation or select a new symbol to be transmitted taking into consideration previously transmitted symbols. However, these constellation were still designed based on a minimum distance criteria . . .

SUMMARY OF THE INVENTION

[0008] Systems and methods are described for constructing a modulation such that the constrained capacity between a transmitter and a receiver approaches the Gaussian channel capacity limit first described by Shannon [ref Shannon **1948**]. Traditional communications systems employ modulations that leave a significant gap to Shannon Gaussian capacity. The modulations of the present invention reduce, and in some cases, nearly eliminate this gap. The invention does not require specially designed coding mechanisms that tend to transmit some points of a modulation more frequently than others but rather provides a method for locating points (in a one or multiple dimensional space) in order to maximize capacity between the input and output of a bit or symbol mapper and demapper respectively. Practical application of the method allows systems to transmit data at a given rate for less power or to transmit data at a higher rate for the same amount of power.

[0009] One embodiment of the invention includes a transmitter configured to transmit signals to a receiver via a communication channel, where the transmitter, includes a coder configured to receive user bits and output encoded bits at an expanded output encoded bit rate, a mapper configured to map encoded bits to symbols in a symbol constellation, a modulator configured to generate a signal for transmission via the communication channel using symbols generated by the mapper, where the receiver, includes a demodulator configured to demodulate the received signal via the communication channel, a demapper configured to estimate

likelihoods from the demodulated signal, and a decoder that is configured to estimate decoded bits from the likelihoods generated by the demapper. In addition, the symbol constellation is a PAM-8 symbol constellation having constellation points within at least one of the ranges specified in FIGS. **25-46**.

[0010] In a further embodiment, the code is a Turbo code. In another embodiment, the code is a LDPC code.

[0011] In a still further embodiment, the constellation provides an increase in capacity at a predetermined SNR that is at least 5% of the gain in capacity achieved by a constellation optimized for joint capacity at the predetermined SNR.

[0012] In still another embodiment, the constellation provides an increase in capacity at a predetermined SNR that is at least 15% of the gain in capacity achieved by a constellation optimized for joint capacity at the predetermined SNR.

[0013] In a yet further embodiment, the constellation provides an increase in capacity at a predetermined SNR that is at least 30% of the gain in capacity achieved by a constellation optimized for joint capacity at the predetermined SNR.

[0014] In yet another embodiment, the constellation provides an increase in capacity at a predetermined SNR that is at least 45% of the gain in capacity achieved by a constellation optimized for joint capacity at the predetermined SNR.

[0015] A further embodiment again, the constellation provides an increase in capacity at a predetermined SNR that is at least 60% of the gain in capacity achieved by a constellation optimized for joint capacity at the predetermined SNR.

[0016] In another embodiment again, the constellation provides an increase in capacity at a predetermined SNR that is at least 100% of the gain in capacity achieved by a constellation optimized for joint capacity at the predetermined SNR.

[0017] In a further additional embodiment, the constellation provides an increase in capacity at a predetermined SNR that is at least 5% of the gain in capacity achieved by a constellation optimized for PD capacity at the predetermined SNR.

[0018] In another additional embodiment, the constellation provides an increase in capacity at a predetermined SNR that is at least 40% of the gain in capacity achieved by a constellation optimized for PD capacity at the predetermined SNR.

[0019] In a still yet further embodiment, the constellation provides an increase in capacity at a predetermined SNR that is at least 50% of the gain in capacity achieved by a constellation optimized for PD capacity at the predetermined SNR.

[0020] In still yet another embodiment, the constellation provides an increase in capacity at a predetermined SNR that is at least 60% of the gain in capacity achieved by a constellation optimized for PD capacity at the predetermined SNR.

[0021] In a still further embodiment again, the constellation provides an increase in capacity at a predetermined SNR that is at least 70% of the gain in capacity achieved by a constellation optimized for PD capacity at the predetermined SNR.

[0022] In still another embodiment again, the constellation provides an increase in capacity at a predetermined SNR that is at least 100% of the gain in capacity achieved by a constellation optimized for PD capacity at the predetermined SNR.

[0023] A still further additional embodiment includes a transmitter configured to transmit signals to a receiver via a communication channel, where the transmitter, includes a coder configured to receive user bits and output encoded bits at an expanded output encoded bit rate, a mapper configured to map encoded bits to symbols in a symbol constellation, a modulator configured to generate a signal for transmission via the communication channel using symbols generated by the mapper, where the receiver, includes a demodulator configured to demodulate the received signal via the communication channel, a demapper configured to estimate likelihoods from the demodulated signal, and a decoder that is configured to estimate decoded bits from the likelihoods generated by the demapper. In addition, the symbol constellation is a PAM-16 symbol constellation having constellation points within at least one of the ranges specified in FIGS. **47-84**.

[0024] Still another additional embodiment includes a transmitter configured to transmit signals to a receiver via a communication channel, where the transmitter, includes a coder configured to receive user bits and output encoded bits at an expanded output encoded bit rate, a mapper configured to map encoded bits to symbols in a symbol constellation, a modulator configured to generate a signal for transmission via the communication channel using symbols generated by the mapper, where the receiver, includes a demodulator configured to demodulate the received signal via the communication channel, a demapper configured to estimate likelihoods from the demodulated signal, and a decoder that is configured to estimate decoded bits from the likelihoods generated by the demapper. In addition, the symbol constellation is a PAM-32 symbol constellation having constellation points within at least one of the ranges specified in FIGS. **85-148**.

[0025] Another further embodiment includes a transmitter configured to transmit signals to a receiver via a communication channel, where the transmitter, includes a coder configured to receive user bits and output encoded bits at an expanded output encoded bit rate, a mapper configured to map encoded bits to symbols in a symbol constellation, a modulator configured to generate a signal for transmission via the communication channel using symbols generated by the mapper, where the receiver, includes a demodulator configured to demodulate the received signal via the communication channel, a demapper configured to estimate likelihoods from the demodulated signal, and a decoder that is configured to estimate decoded bits from the likelihoods generated by the demapper. In addition, the symbol constellation is a N-Dimensional symbol constellation, where the constellation points in at least one dimension are within at least one of the ranges specified in FIGS. **25-167**.

BRIEF DESCRIPTION OF DRAWINGS

[0026] FIG. **1** is a conceptual illustration of a communication system in accordance with an embodiment of the invention.

[0027] FIG. **2** is a conceptual illustration of a transmitter in accordance with an embodiment of the invention.

[0028] FIG. **3** is a conceptual illustration of a receiver in accordance with an embodiment of the invention.

[0029] FIG. **4***a* is a conceptual illustration of the joint capacity of a channel.

[0030] FIG. **4***b* is a conceptual illustration of the parallel decoding capacity of a channel.

[0031] FIG. **5** is a flow chart showing a process for obtaining a constellation optimized for capacity for use in a communication system having a fixed code rate and modulation scheme in accordance with an embodiment of the invention.

[0032] FIG. **6***a* is a chart showing a comparison of Gaussian capacity and PD capacity for traditional PAM-2,4,8,16, 32.

[0033] FIG. **6***b* is a chart showing a comparison between Gaussian capacity and joint capacity for traditional PAM-2,4,8,16,32.

[0034] FIG. **7** is a chart showing the SNR gap to Gaussian capacity for the PD capacity and joint capacity of traditional PAM-2,4,8, 16,32 constellations.

[0035] FIG. **8***a* is a chart comparing the SNR gap to Gaussian capacity of the PD capacity for traditional and optimized PAM-2,4,8,16,32 constellations.

[0036] FIG. **8***b* is a chart comparing the SNR gap to Gaussian capacity of the joint capacity for traditional and optimized PAM-2,4,8, 16,32 constellations.

[0037] FIG. **9** is a chart showing Frame Error Rate performance of traditional and PD capacity optimized PAM-32 constellations in simulations involving several different length LDPC codes.

[0038] FIGS. **10***a*-**10***d* are locus plots showing the location of constellation points of a PAM-4 constellation optimized for PD capacity and joint capacity versus user bit rate per dimension and versus SNR.

[0039] FIGS. **11***a* and **11***b* are design tables of PD capacity and joint capacity optimized PAM-4 constellations in accordance with embodiments of the invention.

[0040] FIGS. **12***a*-**12***d* are locus plots showing the location of constellation points of a PAM-8 constellation optimized for PD capacity and joint capacity versus user bit rate per dimension and versus SNR.

[0041] FIGS. **13***a* and **13***b* are design tables of PD capacity and joint capacity optimized PAM-8 constellations in accordance with embodiments of the invention.

[0042] FIGS. **14***a*-**14***d* are locus plots showing the location of constellation points of a PAM-16 constellation optimized for PD capacity and joint capacity versus user bit rate per dimension and versus SNR.

[0043] FIGS. **15***a* and **15***b* are design tables of PD capacity and joint capacity optimized PAM-16 constellations in accordance with embodiments of the invention.

[0044] FIGS. **16***a*-**16***d* are locus plots showing the location of constellation points of a PAM-32 constellation optimized for PD capacity and joint capacity versus user bit rate per dimension and versus SNR.

[0045] FIGS. **17***a* and **17***b* are design tables of PD capacity and joint capacity optimized PAM-32 constellations in accordance with embodiments of the invention.

[0046] FIG. **18** is a chart showing the SNR gap to Gaussian capacity for traditional and capacity optimized PSK constellations.

[0047] FIG. **19** is a chart showing the location of constellation points of PD capacity optimized PSK-32 constellations.

[0048] FIG. **20** is a series of PSK-32 constellations optimized for PD capacity at different SNRs in accordance with embodiments of the invention.

[0049] FIG. **21** illustrates a QAM-64 constructed from orthogonal Cartesian product of two PD optimized PAM-8 constellations in accordance with an embodiment of the invention.

[0050] FIGS. **22***a* and **22***b* are locus plots showing the location of constellation points of a PAM-4 constellation optimized for PD capacity over a fading channel versus user bit rate per dimension and versus SNR.

[0051] FIGS. **23***a* and **23***b* are locus plots showing the location of constellation points of a PAM-8 constellation optimized for PD capacity over a fading channel versus user bit rate per dimension and versus SNR.

[0052] FIGS. **24***a* and **24***b* are locus plots showing the location of constellation points of a PAM-16 constellation optimized for PD capacity over a fading channel versus user bit rate per dimension and versus SNR.

[0053] FIGS. **25-28** are tables showing the performance of geometric PAM-8 constellations optimized for Joint Capacity at specific SNRs in accordance with embodiments of the invention.

[0054] FIGS. **29-32** are tables listing the constellation points corresponding to the geometric PAM-8 constellation designs optimized for Joint Capacity at specific SNRs listed in FIGS. **25-28**.

[0055] FIGS. **33-36** are tables showing maximum ranges for the geometric PAM-8 constellation designs optimized for Joint Capacity at specific SNRs listed in FIGS. **25-28**.

[0056] FIGS. **37-40** are tables showing the performance of geometric PAM-8 constellations optimized for PD Capacity at specific SNRs in accordance with embodiments of the invention.

[0057] FIGS. **41-44** are tables listing the constellation points corresponding to the geometric PAM-8 constellation designs optimized for PD Capacity at specific SNRs listed in FIGS. **37-40**.

[0058] FIGS. **45-46** are tables showing maximum ranges for the geometric PAM-8 constellation designs optimized for PD Capacity at specific SNRs listed in FIGS. **37-40**.

[0059] FIGS. **47-51** are tables showing the performance of geometric PAM-16 constellations optimized for Joint Capacity at specific SNRs in accordance with embodiments of the invention.

[0060] FIGS. **52-61** are tables listing the constellation points corresponding to the geometric PAM-16 constellation designs optimized for Joint Capacity at specific SNRs listed in FIGS. **47-51**.

[0061] FIGS. **62-66** are tables showing maximum ranges for the geometric PAM-16 constellation designs optimized for Joint Capacity at specific SNRs listed in FIGS. **47-51**.

[0062] FIGS. **67-71** are tables showing the performance of geometric PAM-16 constellations optimized for PD Capacity at specific SNRs in accordance with embodiments of the invention.

[0063] FIGS. **72-81** are tables listing the constellation points corresponding to the geometric PAM-16 constellation designs optimized for PD Capacity at specific SNRs listed in FIGS. **67-71**.

[0064] FIGS. **82-84** are tables showing maximum ranges for the geometric PAM-16 constellation designs optimized for PD Capacity at specific SNRs listed in FIGS. **67-71**.

[0065] FIGS. **85-90** are tables showing the performance of geometric PAM-32 constellations optimized for Joint Capacity at specific SNRs in accordance with embodiments of the invention.

[0066] FIGS. **91-114** are tables listing the constellation points corresponding to the geometric PAM-32 constellation designs optimized for Joint Capacity at specific SNRs listed in FIGS. **85-90**.

[0067] FIGS. **115-120** are tables showing maximum ranges for the geometric PAM-32 constellation designs optimized for Joint Capacity at specific SNRs listed in FIGS. **85-90**.

[0068] FIGS. **121-125** are tables showing the performance of geometric PAM-32 constellations optimized for PD Capacity at specific SNRs in accordance with embodiments of the invention.

[0069] FIGS. **126-145** are tables listing the constellation points corresponding to the geometric PAM-32 constellation designs optimized for PD Capacity at specific SNRs listed in FIGS. **121-125**.

[0070] FIGS. **146-148** are tables showing maximum ranges for the geometric PAM-32 constellation designs optimized for Joint Capacity at specific SNRs listed in FIGS. **121-125**.

DETAILED DESCRIPTION OF THE INVENTION

[0071] Turning now to the detailed description of the invention, communication systems in accordance with embodiments of the invention are described that use signal constellations, which have unequally spaced (i.e. 'geometrically' shaped) points. In many embodiments, the communication systems use specific geometric constellations that are capacity optimized at a specific SNR. In addition, ranges within which the constellation points of a capacity optimized constellation can be perturbed and are still likely to achieve a given percentage of the optimal capacity increase compared to a constellation that maximizes d_{min}, are also described. Capacity measures that are used in the selection of the location of constellation points include, but are not limited to, parallel decode (PD) capacity and joint capacity.

[0072] In many embodiments, the communication systems utilize capacity approaching codes including, but not limited to, LDPC and Turbo codes. As is discussed further below, direct optimization of the constellation points of a communication system utilizing a capacity approaching channel code, can yield different constellations depending on the SNR for which they are optimized. Therefore, the same constellation is unlikely to achieve the same coding gains applied across all code rates; that is, the same constellation will not enable the best possible performance across all rates. In many instances, a constellation at one code rate can achieve gains that cannot be achieved at another code rate. Processes for selecting capacity optimized constellations to achieve increased coding gains based upon a specific coding rate in accordance with embodiments of the invention are described below. Constellations points for geometric PAM-8, PAM-16, and PAM-32 constellations that are optimized for joint capacity or PD capacity at specific SNRs are also provided. Additional geometric PAM-8, PAM-16, and PAM-32 constellations that are probabilistically likely to provide performance gains compared to constellations that maximize d_{min}, which were identified by perturbing the constellation points of geometric PAM-8, PAM-16, and PAM-32 constellations optimized for joint capacity or PD capacity, are also described. The constellations are described as being probabilistically likely to provide performance gains, because all possible constellations within the ranges have not been exhaustively searched. Within each disclosed range, a large number of constellations were selected at random, and it was verified that all the selected constellations provided a gain that exceeds the given percentage of the optimal capacity increase achieved by the optimized constellations relative to a constellation that maximizes d_{min} (i.e. a PAM equally spaced constellation). In this way, ranges that are probabilistically likely to provide a performance gain that is at least a predetermined percentage of the optimal increase in capacity can be identified and a specific geometric constellation can be compared against the ranges as a guide to the increase in capacity that is likely to be achieved. In a number of embodiments, the communication systems can adapt the location of points in a constellation in response to channel conditions, changes in code rate and/or to change the target user data rate.

Communication Systems

[0073] A communication system in accordance with an embodiment of the invention is shown in FIG. **1**. The communication system **10** includes a source **12** that provides user bits to a transmitter **14**. The transmitter transmits symbols over a channel to a receiver **16** using a predetermined modulation scheme. The receiver uses knowledge of the modulation scheme, to decode the signal received from the transmitter. The decoded bits are provided to a sink device that is connected to the receiver.

[0074] A transmitter in accordance with an embodiment of the invention is shown in FIG. **2**. The transmitter **14** includes a coder **20** that receives user bits from a source and encodes the bits in accordance with a predetermined coding scheme. In a number of embodiments, a capacity approaching code such as a turbo code or a LDPC code is used. In other embodiments, other coding schemes can be used to providing a coding gain within the communication system. A mapper **22** is connected to the coder. The mapper maps the bits output by the coder to a symbol within a geometrically distributed signal constellation stored within the mapper. The mapper provides the symbols to a modulator **24**, which modulates the symbols for transmission via the channel.

[0075] A receiver in accordance with an embodiment of the invention is illustrated in FIG. **3**. The receiver **16** includes a demodulator **30** that demodulates a signal received via the channel to obtain symbol or bit likelihoods. The demapper uses knowledge of the geometrically shaped symbol constellation used by the transmitter to determine these likelihoods. The demapper **32** provides the likelihoods to a decoder **34** that decodes the encoded bit stream to provide a sequence of received bits to a sink.

Geometrically Shaped Constellations

[0076] Transmitters and receivers in accordance with embodiments of the invention utilize geometrically shaped symbol constellations. In several embodiments, a geometrically shaped symbol constellation is used that optimizes the capacity of the constellation. In many embodiments, geometrically shaped symbol constellations, which include constellation points within predetermined ranges of the constellation points of a capacity optimized constellation, and that

provide improved capacity compared to constellations that maximize d_{min} are used. Various geometrically shaped symbol constellations that can be used in accordance with embodiments of the invention, techniques for deriving geometrically shaped symbol constellations are described below.

Selection of a Geometrically Shaped Constellations

[0077] Selection of a geometrically shaped constellation for use in a communication system in accordance with an embodiment of the invention can depend upon a variety of factors including whether the code rate is fixed. In many embodiments, a geometrically shaped constellation is used to replace a conventional constellation (i.e. a constellation maximized for d_{min}) in the mapper of transmitters and the demapper of receivers within a communication system. Upgrading a communication system involves selection of a constellation and in many instances the upgrade can be achieved via a simple firmware upgrade. In other embodiments, a geometrically shaped constellation is selected in conjunction with a code rate to meet specific performance requirements, which can for example include such factors as a specified bit rate, a maximum transmit power. Processes for selecting a geometric constellation when upgrading existing communication systems and when designing new communication systems are discussed further below.

Upgrading Existing Communication Systems

[0078] A geometrically shaped constellation that provides a capacity, which is greater than the capacity of a constellation maximized for d_{min}, can be used in place of a conventional constellation in a communication system in accordance with embodiments of the invention. In many instances, the substitution of the geometrically shaped constellation can be achieved by a firmware or software upgrade of the transmitters and receivers within the communication system. Not all geometrically shaped constellations have greater capacity than that of a constellation maximized for d_{min}. One approach to selecting a geometrically shaped constellation having a greater capacity than that of a constellation maximized for d_{min} is to optimize the shape of the constellation with respect to a measure of the capacity of the constellation for a given SNR. Another approach is to select a constellation from a range that is probabilistically likely to yield a constellation having at least a predetermined percentage of the optimal capacity increase. Such an approach can prove useful in circumstances, for example, where an optimized constellation is unable to be implemented. Capacity measures that can be used in the optimization process can include, but are not limited to, joint capacity or parallel decoding capacity.

Joint Capacity and Parallel Decoding Capacity

[0079] A constellation can be parameterized by the total number of constellation points, M, and the number of real dimensions, N_{dim}. In systems where there are no belief propagation iterations between the decoder and the constellation demapper, the constellation demapper can be thought of as part of the channel. A diagram conceptually illustrating the portions of a communication system that can be considered part of the channel for the purpose of determining PD capacity is shown in FIG. **4***a*. The portions of the communication system that are considered part of the channel are indicated by the ghost line **40**. The capacity of the channel defined as such is the parallel decoding (PD) capacity, given by:

$$C_{PD} = \sum_{i=0}^{l-1} I(X_i:Y)$$

where X_i is the ith bit of the I-bits transmitted symbol, and Y is the received symbol, and I(A;B) denotes the mutual information between random variables A and B.

[0080] Expressed another way, the PD capacity of a channel can be viewed in terms of the mutual information between the output bits of the encoder (such as an LDPC encoder) at the transmitter and the likelihoods computed by the demapper at the receiver. The PD capacity is influenced by both the placement of points within the constellation and by the labeling assignments.

[0081] With belief propagation iterations between the demapper and the decoder, the demapper can no longer be viewed as part of the channel, and the joint capacity of the constellation becomes the tightest known bound on the system performance. A diagram conceptually illustrating the portions of a communication system that are considered part of the channel for the purpose of determining the joint capacity of a constellation is shown in FIG. **4***b*. The portions of the communication system that are considered part of the channel are indicated by the ghost line **42**. The joint capacity of the channel is given by:

$$C_{JOINT}=I(X;\ Y)$$

[0082] Joint capacity is a description of the achievable capacity between the input of the mapper on the transmit side of the link and the output of the channel (including for example AWGN and Fading channels). Practical systems must often 'demap' channel observations prior to decoding. In general, the step causes some loss of capacity. In fact it can be proven that $C_0 \geq C_{JOINT} \geq C_{pp}$. That is, C_{JOINT} upper bounds the capacity achievable by CPD. The methods of the present invention are motivated by considering the fact that practical limits to a given communication system capacity are limited by C_{JOINT} and CPD. In several embodiments of the invention, geometrically shaped constellations are selected that maximize these measures.

Selecting a Constellation Having an Optimal Capacity

[0083] Geometrically shaped constellations in accordance with embodiments of the invention can be designed to optimize capacity measures including, but not limited to PD capacity or joint capacity. A process for selecting the points, and potentially the labeling, of a geometrically shaped constellation for use in a communication system having a fixed code rate in accordance with an embodiment of the invention is shown in FIG. **5**. The process **50** commences with the selection (**52**) of an appropriate constellation size M and a desired capacity per dimension η. In the illustrated embodiment, the process involves a check (**52**) to ensure that the constellation size can support the desired capacity. In the event that the constellation size could support the desired capacity, then the process iteratively optimizes the M-ary constellation for the specified capacity. Optimizing a constellation for a specified capacity often involves an iterative process, because the optimal constellation depends upon the

SNR at which the communication system operates. The SNR for the optimal constellation to give a required capacity is not known a priori. Throughout the description of the present invention SNR is defined as the ratio of the average constellation energy per dimension to the average noise energy per dimension. In most cases the capacity can be set to equal the target user bit rate per symbol per dimension. In some cases adding some implementation margin on top of the target user bit rate could result in a practical system that can provide the required user rate at a lower rate. The margin is code dependent. The following procedure could be used to determine the target capacity that includes some margin on top of the user rate. First, the code (e.g. LDPC or Turbo) can be simulated in conjunction with a conventional equally spaced constellation. Second, from the simulation results the actual SNR of operation at the required error rate can be found. Third, the capacity of the conventional constellation at that SNR can be computed. Finally, a geometrically shaped constellation can be optimized for that capacity.

[0084] In the illustrated embodiment, the iterative optimization loop involves selecting an initial estimate of the SNR at which the system is likely to operate (i.e. SNR_{in}). In several embodiments the initial estimate is the SNR required using a conventional constellation. In other embodiments, other techniques can be used for selecting the initial SNR. An M-ary constellation is then obtained by optimizing (**56**) the constellation to maximize a selected capacity measure at the initial SNR_{in} estimate. Various techniques for obtaining an optimized constellation for a given SNR estimate are discussed below.

[0085] The SNR at which the optimized M-ary constellation provides the desired capacity per dimension η (SNR_{out}) is determined (**57**). A determination (**58**) is made as to whether the SNR_{out} and SNR_{in} have converged. In the illustrated embodiment convergence is indicated by SNR_{out} equaling SNR_{in}. In a number of embodiments, convergence can be determined based upon the difference between SNR_{out} and SNR_{in} being less than a predetermined threshold. When SNR_{out} and SNR_{in} have not converged, the process performs another iteration selecting SNR_{out} as the new SNR_{in} (**55**). When SNR_{out} and SNR_{in} have converged, the capacity measure of the constellation has been optimized. As is explained in more detail below, capacity optimized constellations at low SNRs are geometrically shaped constellations that can achieve significantly higher performance gains (measured as reduction in minimum required SNR) than constellations that maximize d_{min}.

[0086] The process illustrated in FIG. **5** can maximize PD capacity or joint capacity of an M-ary constellation for a given SNR. Although the process illustrated in FIG. **5** shows selecting an M-ary constellation optimized for capacity, a similar process could be used that terminates upon generation of an M-ary constellation where the SNR gap to Gaussian capacity at a given capacity is a predetermined margin lower than the SNR gap of a conventional constellation, for example 0.5 db. Alternatively, other processes that identify M-ary constellations having capacity greater than the capacity of a conventional constellation can be used in accordance with embodiments of the invention. For example, the effect of perturbations on the constellation points of optimized constellations can be used to identify ranges in which predetermined performance improvements are probabilistically likely to be obtained. The ranges can then be used to select geometrically shaped constellations for use in a communication system. A geometrically shaped constellation in accordance with embodiments of the invention can achieve greater capacity than the capacity of a constellation that maximizes d_{min} without having the optimal capacity for the SNR range within which the communication system operates.

[0087] We note that constellations designed to maximize joint capacity may also be particularly well suited to codes with symbols over GF(q), or with multi-stage decoding. Conversely constellations optimized for PD capacity could be better suited to the more common case of codes with symbols over GF(2)

Optimizing the Capacity of an M-Ary Constellation at a Given Snr

[0088] Processes for obtaining a capacity optimized constellation often involve determining the optimum location for the points of an M-ary constellation at a given SNR. An optimization process, such as the optimization process **56** shown in FIG. **5**, typically involves unconstrained or constrained non-linear optimization. Possible objective functions to be maximized are the Joint or PD capacity functions. These functions may be targeted to channels including but not limited to Additive White Gaussian Noise (AWGN) or Rayleigh fading channels. The optimization process gives the location of each constellation point identified by its symbol labeling. In the case where the objective is joint capacity, point bit labelings are irrelevant meaning that changing the bit labelings doesn't change the joint capacity as long as the set of point locations remains unchanged . . .

[0089] The optimization process typically finds the constellation that gives the largest PD capacity or joint capacity at a given SNR. The optimization process itself often involves an iterative numerical process that among other things considers several constellations and selects the constellation that gives the highest capacity at a given SNR. In other embodiments, the constellation that requires the least SNR to give a required PD capacity or joint capacity can also be found. This requires running the optimization process iteratively as shown in FIG. **5**.

[0090] Optimization constraints on the constellation point locations may include, but are not limited to, lower and upper bounds on point location, peak to average power of the resulting constellation, and zero mean in the resulting constellation. It can be easily shown that a globally optimal constellation will have zero mean (no DC component). Explicit inclusion of a zero mean constraint helps the optimization routine to converge more rapidly. Except for cases where exhaustive search of all combinations of point locations and labelings is possible it will not necessarily always be the case that solutions are provably globally optimal. In cases where exhaustive search is possible, the solution provided by the non-linear optimizer is in fact globally optimal.

[0091] The processes described above provide examples of the manner in which a geometrically shaped constellation having an increased capacity relative to a conventional capacity can be obtained for use in a communication system having a fixed code rate and modulation scheme. The actual gains achievable using constellations that are optimized for capacity compared to conventional constellations that maximize d_{min} are considered below.

Gains Achieved by Optimized Geometrically Spaced Constellations

[0092] The ultimate theoretical capacity achievable by any communication method is thought to be the Gaussian capacity, CG which is defined as:

$$C_G = \frac{1}{2}\log_2(1 + SNR)$$

[0093] Where signal-to-noise (SNR) is the ratio of expected signal power to expected noise power. The gap that remains between the capacity of a constellation and CG can be considered a measure of the quality of a given constellation design.

[0094] The gap in capacity between a conventional modulation scheme in combination with a theoretically optimal coder can be observed with reference to FIGS. **6***a* and **6***b*. FIG. **6***a* includes a chart **60** showing a comparison between Gaussian capacity and the PD capacity of conventional PAM-2, 4, 8, 16, and 32 constellations that maximize d_{min}. Gaps **62** exist between the plot of Gaussian capacity and the PD capacity of the various PAM constellations. FIG. **6***b* includes a chart **64** showing a comparison between Gaussian capacity and the joint capacity of conventional PAM-2, 4, 8, 16, and 32 constellations that maximize d_{min}, Gaps **66** exist between the plot of Gaussian capacity and the joint capacity of the various PAM constellations. These gaps in capacity represent the extent to which conventional PAM constellations fall short of obtaining the ultimate theoretical capacity i.e. the Gaussian capacity.

[0095] In order to gain a better view of the differences between the curves shown in FIGS. **6***a* and **6***b* at points close to the Gaussian capacity, the SNR gap to Gaussian capacity for different values of capacity for each constellation are plotted in FIG. **7**. It is interesting to note from the chart **70** in FIG. **7** that (unlike the joint capacity) at the same SNR, the PD capacity does not necessarily increase with the number of constellation points. As is discussed further below, this is not the case with PAM constellations optimized for PD capacity.

[0096] FIGS. **8***a* and **8***b* summarize performance of constellations for PAM-4, 8, 16, and 32 optimized for PD capacity and joint capacity (it should be noted that BPSK is the optimal PAM-2 constellation at all code rates). The constellations are optimized for PD capacity and joint capacity for different target user bits per dimension (i.e. code rates). The optimized constellations are different depending on the target user bits per dimension, and also depending on whether they have been designed to maximize the PD capacity or the joint capacity. All the PD optimized PAM constellations are labeled using a gray labeling which is not always the binary reflective gray labeling. It should be noted that not all gray labels achieve the maximum possible PD capacity even given the freedom to place the constellation points anywhere on the real line. FIG. **8***a* shows the SNR gap for each constellation optimized for PD capacity. FIG. **8***b* shows the SNR gap to Gaussian capacity for each constellation optimized for joint capacity. Again, it should be emphasized that each '+' on the plot represents a different constellation.

[0097] Referring to FIG. **8***a*, the coding gain achieved using a constellation optimized for PD capacity can be appreciated by comparing the SNR gap at a user bit rate per dimension of 2.5 bits for PAM-32. A user bit rate per dimension of 2.5 bits for a system transmitting 5 bits per symbol constitutes a code rate of ½. At that code rate the constellation optimized for PD capacity provides an additional coding gain of approximately 1.5 dB when compared to the conventional PAM-32 constellation.

[0098] The SNR gains that can be achieved using constellations that are optimized for PD capacity can be verified through simulation. The results of a simulation conducted using a rate 1/2 LDPC code in conjunction with a conventional PAM-32 constellation and in conjunction with a PAM-32 constellation optimized for PD capacity are illustrated in FIG. **9**. A chart **90** includes plots of Frame Error Rate performance of the different constellations with respect to SNR and using different length codes (i.e. k=4,096 and k=16,384). Irrespective of the code that is used, the constellation optimized for PD capacity achieves a gain of approximately 1.3 dB, which closely approaches the gain predicted from FIG. **8***a*.

Capacity Optimized Pam Constellations

[0099] Using the processes outlined above, locus plots of PAM constellations optimized for capacity can be generated that show the location of points within PAM constellations versus SNR. Locus plots of PAM-4, 8, 16, and 32 constellations optimized for PD capacity and joint capacity and corresponding design tables at various typical user bit rates per dimension are illustrated in FIGS. **10***a*-**17***b*. The locus plots and design tables show PAM-4, 8, 16, and 32 constellation point locations and labelings from low to high SNR corresponding to a range of low to high spectral efficiency.

[0100] In FIG. **10***a*, a locus plot **100** shows the location of the points of PAM-4 constellations optimized for joint capacity plotted against achieved capacity. A similar locus plot **105** showing the location of the points of joint capacity optimized PAM-4 constellations plotted against SNR is included in FIG. **10***b*. In FIG. **10***c*, the location of points for PAM-4 optimized for PD capacity is plotted against achievable capacity and in FIG. **10***d* the location of points for PAM-4 for PD capacity is plotted against SNR. At low SNRs, the PD capacity optimized PAM-4 constellations have only 2 unique points, while the joint capacity optimized constellations have 3. As SNR is increased, each optimization eventually provides 4 unique points. This phenomenon is explicitly described in FIG. **11***a* and FIG. **11***b* where vertical slices of FIGS. **10***ab* and **10***cd* are captured in tables describing some PAM-4 constellations designs of interest. The SNR slices selected represent designs that achieve capacities={0.5, 0.75, 1.0, 1.25, 1.5} bits per symbol (bps). Given that PAM-4 can provide at most $\log_2(4)=2$ bps, these design points represent systems with information code rates R={¼, ⅜, ½, ⅝, ¾} respectively.

[0101] FIGS. **12***ab* and **12***cd* present locus plots of PD capacity and joint capacity optimized PAM-8 constellation points versus achievable capacity and SNR. FIGS. **13***a* and **13***b* provide slices from these plots at SNRs corresponding to achievable capacities η={0.5, 1.0, 1.5, 2.0, 2.5} bps. Each of these slices correspond to systems with code rate R=η bps/$\log_2$ (8), resulting in R={⅙, ⅓, ½, ⅔, ⅚}. As an example of the relative performance of the constellations in these tables, consider FIG. **13***b* which shows a PD capacity optimized PAM-8 constellation optimized for SNR=9.00 dB, or 1.5 bps. We next examine the plot provided in FIG. **8***a* and see that the gap of the optimized constellation to the

ultimate, Gaussian, capacity (CG) is approximately 0.5 dB. At the same spectral efficiency, the gap of the traditional PAM-8 constellation is approximately 1.0 dB. The advantage of the optimized constellation is 0.5 dB for the same rate (in this case R=½). This gain can be obtained by only changing the mapper and demapper in the communication system and leaving all other blocks the same.

[0102] Similar information is presented in FIGS. **14***a*-**14***d*, and **15***a*-**15***b* which provide loci plots and design tables for PAM-16 PD capacity and joint capacity optimized constellations. Likewise FIGS. **16***a*-**16***d*, **17***a* and **17***b* provide loci plots and design tables for PAM-32 PD capacity and joint capacity optimized constellations.

Capacity Optimized Psk Constellations

[0103] Traditional phase shift keyed (PSK) constellations are already quite optimal. This can be seen in the chart **180** comparing the SNR gaps of tradition PSK with capacity optimized PSK constellations shown in FIG. **18** where the gap between PD capacity and Gaussian capacity is plotted for traditional PSK-4, 8, 16, and 32 and for PD capacity optimized PSK-4, 8, 16, and 32.

[0104] The locus plot of PD optimized PSK-32 points across SNR is shown in FIG. **19**, which actually characterizes all PSKs with spectral efficiency $\eta \leq 5$. This can be seen in FIG. **20**. Note that at low SNR (0.4 dB) the optimal PSK-32 design is the same as traditional PSK-4, at SNR=8.4 dB optimal PSK-32 is the same as traditional PSK-8, at SNR=14.8 dB optimal PSK-32 is the same as traditional PSK-16, and finally at SNRs greater than 20.4 dB optimized PSK-32 is the same as traditional PSK-32. There are SNRs between these discrete points (for instance SNR=2 and 15 dB) for which optimized PSK-32 provides superior PD capacity when compared to traditional PSK constellations.

[0105] We note now that the locus of points for PD optimized PSK-32 in FIG. **19** in conjunction with the gap to Gaussian capacity curve for optimized PSK-32 in FIG. **18** implies a potential design methodology. Specifically, the designer could achieve performance equivalent or better than that enabled by traditional PSK-4,8, and 16 by using only the optimized PSK-32 in conjunction with a single tuning parameter that controlled where the constellation points should be selected from on the locus of FIG. **19**. Such an approach would couple a highly rate adaptive channel code that could vary its rate, for instance, rate 4/5 to achieve and overall (code plus optimized PSK-32 modulation) spectral efficiency of 4 bits per symbol, down to ⅕ to achieve an overall spectral efficiency of 1 bit per symbol. Such an adaptive modulation and coding system could essentially perform on the optimal continuum represented by the rightmost contour of FIG. **18**.

Adaptive Rate Design

[0106] In the previous example spectrally adaptive use of PSK-32 was described. Techniques similar to this can be applied for other capacity optimized constellations across the link between a transmitter and receiver. For instance, in the case where a system implements quality of service it is possible to instruct a transmitter to increase or decrease spectral efficiency on demand. In the context of the current invention a capacity optimized constellation designed precisely for the target spectral efficiency can be loaded into the transmit mapper in conjunction with a code rate selection that meets the end user rate goal. When such a modulation/code rate change occurred a message could propagated to the receiver so that the receiver, in anticipation of the change, could select a demapper/decoder configuration in order to match the new transmit-side configuration.

[0107] Conversely, the receiver could implement a quality of performance based optimized constellation/code rate pair control mechanism. Such an approach would include some form of receiver quality measure. This could be the receiver's estimate of SNR or bit error rate. Take for example the case where bit error rate was above some acceptable threshold. In this case, via a backchannel, the receiver could request that the transmitter lower the spectral efficiency of the link by swapping to an alternate capacity optimized constellation/code rate pair in the coder and mapper modules and then signaling the receiver to swap in the complementary pairing in the demapper/decoder modules.

Geometrically Shaped Qam Constellations

[0108] Quadrature amplitude modulation (QAM) constellations can be constructed by orthogonalizing PAM constellations into QAM in phase and quadrature components. Constellations constructed in this way can be attractive in many applications because they have low-complexity demappers.

[0109] In FIG. **21** we provide an example of a Quadrature Amplitude Modulation constellation constructed from a Pulse Amplitude Modulation constellation. The illustrated embodiment was constructed using a PAM-8 constellation optimized for PD capacity at user bit rate per dimension of 1.5 bits (corresponds to an SNR of 9.0 dB) (see FIG. **13***b*). The label-point pairs in this PAM-8 constellation are {(000, −1.72), (001, −0.81), (010, 1.72), (011, −0.62), (100, 0.62), (101, 0.02), (110, 0.81), (111, −0.02)}. Examination of FIG. **21** shows that the QAM constellation construction is achieved by replicating a complete set of PAM-8 points in the quadrature dimension for each of the 8 PAM-8 points in the in-phase dimension. Labeling is achieved by assigning the PAM-8 labels to the LSB range on the in-phase dimension and to the MSB range on the quadrature dimension. The resulting 8×8 outer product forms a highly structured QAM-64 for which very low-complexity de-mappers can be constructed. Due to the orthogonality of the in-phase and quadrature components the capacity characteristics of the resulting QAM-64 constellation are identical to that of the PAM-8 constellation on a per-dimension basis.

N-Dimensional Constellation Optimization

[0110] Rather than designing constellations in 1-D (PAM for instance) and then extending to 2-D (QAM), it is possible to take direct advantage in the optimization step of the additional degree of freedom presented by an extra spatial dimension. In general it is possible to design N-dimensional constellations and associated labelings. The complexity of the optimization step grows exponentially in the number of dimensions as does the complexity of the resulting receiver de-mapper. Such constructions constitute embodiments of the invention and simply require more 'run-time' to produce.

Capacity Optimized Constellations for Fading Channels

[0111] Similar processes to those outlined above can be used to design capacity optimized constellations for fading channels in accordance with embodiments of the invention.

The processes are essentially the same with the exception that the manner in which capacity is calculated is modified to account for the fading channel. A fading channel can be described using the following equation:

$$Y = a(t) \cdot X + N$$

where X is the transmitted signal, Nis an additive white Gaussian noise signal and a (t) is the fading distribution, which is a function of time.

[0112] In the case of a fading channel, the instantaneous SNR at the receiver changes according to a fading distribution. The fading distribution is Rayleigh and has the property that the average SNR of the system remains the same as in the case of the AWGN channel, $E[X^2]/E[N^2]$. Therefore, the capacity of the fading channel can be computed by taking the expectation of AWGN capacity, at a given average SNR, over the Rayleigh fading distribution of a that drives the distribution of the instantaneous SNR.

[0113] Many fading channels follow a Rayleigh distribution. FIGS. **22***a*-**24***b* are locus plots of PAM-4, 8, and 16 constellations that have been optimized for PD capacity on a Rayleigh fading channel. Locus plots versus user bit rate per dimension and versus SNR are provided. Similar processes can be used to obtain capacity optimized constellations that are optimized using other capacity measures, such as joint capacity, and/or using different modulation schemes.

Geometric PAM-8, PAM-16, and PAM-32 Constellations

[0114] As described above, geometric constellations can be obtained that are optimized for joint or PD capacity at specific SNRs. In addition, ranges can be specified for the constellation points of a geometric constellation that are probabilistically likely to result in geometric constellations that provide at least a predetermined performance improvement relative to a constellation that maximizes d_{min}. Turning now to FIGS. **25-167**, geometric PAM-8, PAM-16, and PAM-32 constellations optimized for joint and PD capacity over the Additive White Gaussian Noise (AWGN) channel at specific SNRs are listed. The performances of the optimal constellations are compared to the performances of traditional constellations that maximize d_{min}. Ranges for the constellation points are also defined at specific SNRs, where constellations having constellation points selected from within the ranges are probabilistically likely (with probability close to one) to result in at least a predetermined performance improvement at the specified SNR relative to a traditional constellation that maximizes d_{min}.

[0115] The geometric constellations disclosed in FIGS. **25-167** are defined by points y(i) such that y(i)=k(x (i)+r (i))+c. Values for x(i) and bounds on r(i) are provided in FIGS. **25-167** for PAM-8, PAM-16, and PAM-32 optimized for joint and PD capacity. For PAM-8$0 \le i \le 7$, PAM-16 $0 \le i \le 15$, and for PAM-32 $0 \le i \le 31$. To achieve optimal power efficiency, c should be set to zero. In addition to optimized constellations, FIGS. **25-167** specify ranges for the points of a geometric constellation, where selecting the points of a constellation from within the ranges is probabilistically likely to provide a geometric constellation having at least a predetermined performance improvement relative to a constellation that maximizes d_{min}. The ranges are expressed as a maximum value for the constellation range parameter, r (i), which specifies the amount by which the point x (i) in the constellation is perturbed relative to the location of the corresponding point in the optimal constellation. A communication system using a constellation formed from constellations points selected from within the ranges specified by the maximum value (i.e. $-r_{max} \le r(i) \le r_{max}$) is probabilistically likely to achieve a predetermined performance improvement relative to a constellation that maximizes d_{min}. The predetermined performance improvements associated with the ranges specified in FIGS. **25-167** are expressed in terms of a percentage of the increase in capacity achieved by the optimized constellation relative to a constellation that maximizes d_{min}. Constellations formed from constellation points selected from within the ranges are probabilistically likely to achieve an increase in capacity at least as great as the indicated percentage.

[0116] With regard to the specific tables shown in FIGS. **25-167**, each table is one of three different types of table. A first set of tables shows the performance of specific geometric constellations optimized for joint capacity or PD capacity. These tables include 6 columns. The first column enumerates a design number. The second column provides the SNR at which the constellation was optimized for the design defined by the entry in the first column. The third column provides the capacity achieved by the optimized constellation (Opt. Cap) at the SNR given in the second column. The fourth column provides the capacity achieved (Std. Cap) by a traditional uniformly spaced constellation i.e. a PAM constellation that maximizes d_{min} (with the same number of points as the optimized constellation and where binary reflective gray labeling is assumed) at the SNR given in the second column. The fifth column shows the gain in bits per transmission provided by the optimized constellation over a constellation that maximizes d_{min}. The sixth column shows the percentage gain in capacity provided by the optimized constellation over the capacity provided by the traditional uniformly spaced constellation.

[0117] A second set of tables lists the constellation points of the designs indicated in the first set of tables. These tables contain 9 columns. The first column enumerates a design number. The remaining 8 columns describe a constellation point x (i) enumerated by label in the second row of the table. Labels are given in decimal number format. With PAM 8 as an example, a label of 011 is given as the decimal number **3**.

[0118] The third set of tables specifies maximum perturbation ranges for the capacity optimized constellations indicated in the first set of tables, where the maximum ranges correspond to a high probabilistic likelihood of at least a predetermined performance improvement relative to a constellation that maximizes d_{min}. These tables contain 8 columns. The first enumerates a design number (corresponding to a design from one of the aforementioned tables). The second column provides the SNR for the design defined by the entry in the first column. The remaining 5 columns describe parameter Imax which is the maximum amount any point in the designed constellation may be perturbed (in either the positive or negative direction) and still retain, with probability close to unity, at least the gain noted by each column header of the joint or PD capacity as a percentage of the gain provided by the corresponding optimized point design over a traditional constellation that maximizes d_{min} (all at the given SNR). Each table has a last column showing that if 100% of the gain afforded by the optimized constel-

lation is desired, then parameter r (i) must be equal to zero (no deviation from designed points described in the point specification tables).

Example of Performance Achieved by Constellation within Predetermined Ranges

[0119] By way of example, a constellation can be selected using the ranges specified with respect to the constellation points of a geometric PAM-8 constellation optimized with respect to PD capacity at SNR=9 dB. The optimized constellation points are as follows:

[0120] −7.8780−3.7100 7.8780−2.8590 2.8590 0.0990 3.7100−0.0990

[0121] The PD capacity of the above constellation at 9 dB=1.4999 bits. FIGS. **26-167** define a range around each constellation r_{max} of 0.47 that is probabilistically likely to result in a constellation that can be used by a communication system to achieve at least 5% of the gain of the optimized constellation (compared to an equally spaced constellation).

[0122] An example of a PAM-8 constellation formed using constellation points selected from within the specified ranges is as follows:

[0123] −7.8462−3.9552 7.7361−3.2614 2.9395 0.5152 3.3867 0.0829

[0124] The distance between each of the constellation points and the constellation points of the optimized constellation are as follows:

[0125] 0.0318−0.2452−0.1419−0.4024 0.0805 0.4162−0.3233 0.1819

[0126] The magnitude of each of the distances is less than Imax at 9 dB (i.e. 0.47). The capacity of the selected constellation=1.4884. The capacity of a constellation that maximizes d_{min} at 9 dB=1.435 bits. Therefore, the selected constellation achieves 82% of the gain made possible by the optimal constellation (i.e. at least 5%).

Labelling of Constellations Using Cyclically Rotated Binary Reflective Gray Labels

[0127] In performing optimization with respect to PD capacity, a conjecture can be made that constraining the optimization process to the subsequently described class of labelings results in no or negligible loss in PD capacity (the maximum observed loss is 0.005 bits, but in many cases there is no loss at all). Use of this labeling constraint speeds the optimization process considerably. We note that joint capacity optimization is invariant to choice of labeling. Specifically, joint capacity depends only on point locations whereas PD capacity depends on point locations and respective labelings.

[0128] The class of cyclically rotated binary reflective gray labels can be used. The following example, using constellations with cardinality **8**, describes the class of cyclically rotated binary reflective gray labels. Given for example the standard gray labeling scheme for PAM-8:000,

[0129] 001, 011, 010, 110, 111, 101, 100

[0130] Application of a cyclic rotation, one step left, yields:

[0131] 001, 011, 010, 110, 111, 101, 100, 000

[0132] Application of a cyclic rotation, two steps left, yields:

[0133] 011, 010, 110, 111, 101, 100, 000, 001

[0134] For a constellation with cardinality **8**, cyclic rotations of 0 to 7 steps can be applied. It should be noted that within this class of labelings, some labelings perform better than others. It should also be noted that different rotations may yield labelings that are equivalent (through trivial column swapping and negation operations). In general, labelings can be expressed in different but equivalent forms through trivial operations such as column swapping and negation operations. For example the binary reflective gray labels with one step rotation:

[0135] 001, 011, 010, 110, 111, 101, 100, 000

[0136] Can be shown to be equivalent to:

[0137] 000, 001, 011, 111, 101, 100, 110, 010

[0138] The above equivalence can be shown by the following steps of trivial operations:

[0139] 1) Negate the third column. This gives

[0140] 000, 010, 011, 111, 110, 100, 101, 001

[0141] 2) Swap the second and third columns. This gives

[0142] 000, 001, 011, 111, 101, 100, 110, 010

The two labelings are considered equivalent because they yield the same PD Capacity as long as the constellation points locations are the same.

[0143] In the constellation point specifications shown in FIGS. **25-167**, a labeling can be interchanged by any equivalent labeling without affecting the performance parameters. A labeling used in the specifications may not directly appear to be a cyclically rotated binary reflective gray labeling, but it can be shown to be equivalent to one or more cyclically rotated binary reflective gray labelings.

Prior Art Geometric Constellations

[0144] Geometric constellations have been specified in the prior art in attempts to achieve performance gains relative to constellations that maximize d_{min}. Examples of such constellations are disclosed in Sommer and Fettweis, "Signal Shaping by Non-Uniform QAM for AWGN Channerls and Applications Using Turbo Coding" *ITG Conference Source and Channel Coding*, p. 81-86, 2000. The specific constellations disclosed by Sommer and Fettweis for PAM-8, PAM-16, and PAM-32 are as follows:

PAM-8:

[0145] −1.6630−0.9617−0.5298−0.1705 0.1705 0.5298 0.9617 1.6630

PAM-16:

[0146] −1.9382−1.3714−1.0509−0.8079−0.6026−0.4185−0.2468−0.0816 0.0816 0.2468 0.4185 0.6026 0.8079 1.0509 1.3714 1.9382

PAM-32:

[0147] −2.1970−1.7095−1.4462−1.2545−1.0991−0.9657−0.8471−0.7390−0.6386 −0.5441−0.4540−0.3673−0.2832−0.2010−0.1201−0.0400 0.0400 0.1201 0.2010 0.2832 0.3673 0.4540 0.5441 0.6386 0.7390 0.8471 0.9657 1.0991 1.2545 1.4462 1.7095 2.1970

[0148] Another class of geometric constellations is disclosed in Long et al., "Approaching the AWGN Channel Capacity without Active Shaping" *Proceedings of International Symposium on Information Theory*, p. 374, 1997. The specific PAM-8, PAM-16, and PAM-32 constellations disclosed by Long et al. are as follows:

PAM-8:

[0149] −3−1−1−1 1 1 1 3

PAM-16:

[0150] −4−2−2−2−2 0 0 0 0 0 0 2 2 2 2 4

PAM-32:

[0151] −5−3−3−3−3−3−1−1−1−1−1−1−1−1−1−1 1 1 1 1 1 111 1 1 3 3 3 3 3 5

[0152] The above prior art constellations are geometric and can provide performance improvements at some SNRs relative to constellations that maximize d_{min}. The performance of the constellations varies with SNR and at certain SNRs the constellations are proximate to capacity optimized constellations. Therefore, the ranges specified in FIGS. **25-167** are defined so that prior art constellations are excluded at the specific SNRs at which these constellations are proximate to a capacity optimized constellation.

Constructing Multidimensional Constellations

[0153] The tables shown in FIGS. **25-167** can be used to identify optimal N-dimensional constellations. The optimized multi-dimensional constellation can be determined by finding the Cartesian power X^n and the resulting labeling constructed by finding the corresponding Cartesian power of L^n. Ranges within which the multi-dimensional constellation points can be selected (i.e. perturbed), can then be defined with respect to each constellation point of the constructed multi-dimensional constellation, using an n-dimensional perturbation vector, such that each component of the perturbation vector has a magnitude that is less than r_{max} defined by the range tables.

Example of a Qam Constellation

[0154] The optimized constellation points for a PAM-8 constellation optimized for PD capacity at SNR=9 dB are as follows:

[0155] −7.8780−3.7100 7.8780−2.8590 2.8590 0.0990 3.7100−0.0990

[0156] The labelings corresponding to the above PAM-8 constellation points are:

[0157] 000 001 010 011 100 101 110 111

[0158] Using this PAM-8 constellation, it is possible to construct a QAM-64 constellation. While PAM-8 maps 3 bits to one dimension, QAM-64 maps 6 bits to two dimensions. The first three bits will determine the location in the X-dimension and the second three bits will determine the location in the Y-dimension. The resulting QAM-64 constellation for example will map the bits 000 010 to the two dimensional constellation point (−7.878, 7.878), and 111 110 to the two dimensional constellation point (−0.099, 3.71). The points corresponding to the remaining labels can be derived in a similar manner.

[0159] The ranges shown in FIGS. **25-167** can be utilized to select QAM constellations in a similar manner to that outlined above with respect to the selection of a PAM-8 constellation based upon ranges specified with respect to a PAM-8 constellation optimized for PD capacity at 9 dB. A range of 0.47 can be applied to every component of each two dimensional constellation point. For example, the two points two points (−7.787, 8.078) and (0.201, 3.31) are within the ranges as they are spaced distances (−0.1, 0.2) and (0.3, −0.4) respectively from the optimized constellation points. In this way, the ranges can be used to identify constellations that are probabilistically likely to result in a performance improvement relative to a constellation that maximizes d_{min}.

[0160] The same procedure can apply to a constellation optimized for joint capacity. However, the choice of labeling does not affect joint capacity. The above procedure can similarly be applied to an N-dimensional constellation constructed from a PAM constellation.

[0161] Although the present invention has been described in certain specific embodiments, many additional modifications and variations would be apparent to those skilled in the art. It is therefore to be understood that the present invention may be practiced otherwise than specifically described, without departing from the scope and spirit of the present invention. Thus, embodiments of the present invention should be considered in all respects as illustrative and not restrictive.

What is claimed is:

1. A communication system, comprising:

a receiver capable of receiving signals via a communication channel having a channel signal-to-noise ratio (SNR), comprising:

a demodulator capable of demodulating a received signal into a demodulated signal;

a demapper, coupled to the demodulator, capable of determining likelihoods using a non-uniform quadrature amplitude modulation (NU-QAM) 256 point symbol constellation selected from a plurality of NU-QAM symbol constellations; and

a decoder, coupled to the demapper, capable of using likelihoods determined by the demapper to provide a sequence of received bits based upon a low density parity check (LDPC) code having a code rate of at least 0.59665;

wherein the selected NU-QAM 256 point symbol constellation is characterized in that the selected NU-QAM 256 point symbol constellation provides a parallel decoding capacity in an Additive White Gaussian Noise (AWGN) channel that is greater than 5.0552 bits per symbol at an SNR that it is at or below 15.6 dB;

wherein the selected NU-QAM 256 point symbol constellation is further characterized in that the selected NU-QAM 256 point symbol constellation provides a parallel decoding capacity in an AWGN channel that is greater than the parallel decoding capacity in an AWGN channel of a uniformly spaced QAM 256 point symbol constellation at SNRs between 15.8 dB and 17.4 dB; and

wherein the receiver is configured to use the selected NU-QAM 256 point symbol constellation to receive data when the channel SNR is an SNR between 15.8 dB and 17.4 dB.

2. The communication system of claim **1**, wherein the receiver is configured to select the NU-QAM 256 point symbol constellation from the plurality of NU-QAM symbol constellations in response to a message from a transmitter.

3. The communication system of claim **1**, wherein the NU-QAM 256 point symbol constellation comprises an in-phase component and a quadrature component, where each component comprises 16 levels of amplitude such that the amplitudes scaled by a scaling factor are:

−17.407, −12.577, −10.411, −7.046, −6.363, −3.255, −3.142, 0.008, 0.008, 3.123, 3.238, 6.397, 7.055, 10.407, 12.566, and 17.398.

4. The communication system of claim **1**, wherein the plurality of NU-QAM symbol constellations further comprises multiple different NU-QAM 64 point symbol constellations, multiple different NU-QAM 256 point symbol constellations, and multiple different NU-QAM 1024 point symbol constellations.

5. The communication system of claim **1**, wherein each of the plurality of NU-QAM symbol constellations is capable of providing a greater parallel decoding capacity at a specific SNR than a similar uniform QAM symbol constellation at the same SNR, where the similar uniform QAM symbol constellation differs only in that the constellation points in the similar uniform QAM symbol constellation are uniformly spaced.

6. The communication system of claim **1**, wherein each of the plurality of NU-QAM symbol constellations is capable of providing a greater parallel decoding capacity at a specific SNR than other NU-QAM 256 point symbol constellations in the plurality of NU-QAM symbol constellations at the same SNR.

7. The communication system of claim **1**, wherein the selected NU-QAM 256 point symbol constellation is capable of providing a greater parallel decoding capacity at an SNR of 15.6 dB than the other NU-QAM symbol constellations in the plurality of NU-QAM symbol constellations at an SNR of 15.6 dB.

8. The communication system of claim **1**, wherein each of the plurality of NU-QAM symbol constellations is characterized by assignment of labels and spacing of constellation points so as to maximize parallel decoding capacity at a specific SNR subject to at least one constraint.

9. The communication system of claim **1**, wherein the receiver is capable of replacing at least one existing symbol constellation with the plurality of NU-QAM symbol constellations by an upgrade to at least one of the receiver software and firmware.

10. The communication system of claim **1**, wherein the selected NU-QAM 256 point symbol constellation is an orthogonalized non-uniform Pulse Amplitude Modulated (NU-PAM) constellation, where the NU-PAM constellation is characterized by assignment of labels and spacing of constellation points in one dimension so as to maximize parallel decoding capacity in an AWGN channel at a specific SNR.

11. The communication system of claim **1**, wherein the selected NU-QAM 256 point symbol constellation is characterized by assignment of labels and spacing of constellation points in two dimensions so as to maximize parallel decoding capacity in an AWGN channel at a specific SNR.

12. A communication system, comprising:

a receiver that receives signals via a communication channel having a channel signal-to-noise ratio (SNR), wherein the receiver comprises:

a demodulator that demodulates a received signal into a demodulated signal;

a demapper that determines likelihoods using a non-uniform quadrature amplitude modulation (NU-QAM) 256 point symbol constellation selected from a plurality of NU-QAM symbol constellations; and

a decoder that uses the likelihoods determined by the demapper to provide a sequence of received bits based upon a low density parity check (LDPC) code having a code rate of at least 0.59665;

wherein the selected NU-QAM 256 point symbol constellation is characterized in that the selected NU-QAM 256 point symbol constellation provides a parallel decoding capacity in an Additive White Gaussian Noise (AWGN) channel that is greater than 5.0552 bits per symbol at an SNR that it is at or below 15.6 dB;

wherein the selected NU-QAM 256 point symbol constellation is further characterized in that the selected NU-QAM 256 point symbol constellation provides a parallel decoding capacity in an AWGN channel that is greater than the parallel decoding capacity in an AWGN channel of a uniformly spaced QAM 256 point symbol constellation at SNRs between 15.8 dB and 17.4 dB; and

wherein the receiver is configured to use the selected NU-QAM 256 point symbol constellation to receive data when the channel SNR is an SNR between 15.8 dB and 17.4 dB.

13. The communication system of claim **12**, wherein the receiver is configured to select the NU-QAM 256 point symbol constellation from the plurality of NU-QAM symbol constellations in response to a message from a transmitter.

14. The communication system of claim **12**, wherein the NU-QAM 256 point symbol constellation comprises an in-phase component and a quadrature component, where each component comprises 16 levels of amplitude such that the amplitudes scaled by a scaling factor are:

−17.407, −12.577, −10.411, −7.046, −6.363, −3.255, −3.142, 0.008, 0.008, 3.123, 3.238, 6.397, 7.055, 10.407, 12.566, and 17.398.

15. The communication system of claim **12**, wherein the plurality of NU-QAM symbol constellations further comprises multiple different NU-QAM 64 point symbol constellations, multiple different NU-QAM 256 point symbol constellations, and multiple different NU-QAM 1024 point symbol constellations.

16. The communication system of claim **12**, wherein each of the plurality of NU-QAM symbol constellations is capable of providing a greater parallel decoding capacity at a specific SNR than a similar uniform QAM symbol constellation at the same SNR, where the similar uniform QAM symbol constellation differs only in that the constellation points in the similar uniform QAM symbol constellation are uniformly spaced.

17. The communication system of claim **12**, wherein each of the plurality of NU-QAM symbol constellations is capable of providing a greater parallel decoding capacity at a specific SNR than the other NU-QAM symbol constellations in the plurality of NU-QAM symbol constellations at the same SNR.

18. The communication system of claim **12**, wherein the selected NU-QAM 256 point symbol constellation is capable of providing a greater parallel decoding capacity at an SNR of 15.6 dB than the other NU-QAM symbol constellations in the plurality of NU-QAM symbol constellations at an SNR of 15.6 dB.

19. The communication system of claim **12**, wherein each of the plurality of NU-QAM symbol constellations is characterized by the assignment of labels and spacing of constellation points so as to maximize parallel decoding capacity at a specific SNR subject to at least one constraint.

20. The communication system of claim **12**, wherein the receiver is capable of replacing at least one existing symbol constellation with the plurality of NU-QAM symbol constellations by an upgrade to at least one of the receiver software and firmware.

21. The communication system of claim **12**, wherein the selected NU-QAM 256 point symbol constellation is an orthogonalized non-uniform Pulse Amplitude Modulated (NU-PAM) constellation, where the NU-PAM constellation is characterized by assignment of labels and spacing of constellation points in one dimension so as to maximize parallel decoding capacity in an AWGN channel at a specific SNR.

22. The communication system of claim **12**, wherein the selected NU-QAM 256 point symbol constellation is characterized by assignment of labels and spacing of constellation points in two dimensions so as to maximize parallel decoding capacity in an AWGN channel at a specific SNR.

23. A communication system, comprising:

a receiver that receives signals via a communication channel having a channel signal-to-noise ratio (SNR), wherein the receiver uses a non-uniform quadrature amplitude modulation (NU-QAM) 256 point symbol constellation selected from a plurality of NU-QAM symbol constellations to transform the received signals into received bits based upon a low density parity check (LDPC) code having a code rate;

wherein the selected NU-QAM 256 point symbol constellation is characterized in that the selected NU-QAM 256 point symbol constellation provides a parallel decoding capacity in an Additive White Gaussian Noise (AWGN) channel that is greater than 5.0552 bits per symbol at an SNR that it is at or below 15.6 dB;

wherein the selected NU-QAM 256 point symbol constellation is further characterized in that the selected NU-QAM 256 point symbol constellation provides a parallel decoding capacity in an AWGN channel that is greater than the parallel decoding capacity in an AWGN channel of a uniformly spaced QAM 256 point symbol constellation at SNRs between 15.8 dB and 17.4 dB; and

wherein the receiver is configured to use the selected NU-QAM 256 point symbol constellation to receive data when the channel SNR is an SNR between 15.8 dB and 17.4 dB.

24. The communication system of claim **23**, wherein the receiver is configured to select the NU-QAM 256 point symbol constellation from the plurality of NU-QAM symbol constellations in response to a message from a transmitter.

25. The communication system of claim **23**, wherein the NU-QAM 256 point symbol constellation comprises an in-phase component and a quadrature component, where each component comprises 16 levels of amplitude such that the amplitudes scaled by a scaling factor are:

−17.407, −12.577, −10.411, −7.046, −6.363, −3.255, −3.142, 0.008, 0.008, 3.123, 3.238, 6.397, 7.055, 10.407, 12.566, and 17.398.

26. The communication system of claim **23**, wherein the plurality of NU-QAM symbol constellations further comprises multiple different NU-QAM 64 point symbol constellations, multiple different NU-QAM 256 point symbol constellations, and multiple different NU-QAM 1024 point symbol constellations.

27. The communication system of claim **23**, wherein each of the plurality of NU-QAM symbol constellations is capable of providing a greater parallel decoding capacity at a specific SNR than a similar uniform QAM symbol constellation at the same SNR, where the similar uniform QAM symbol constellation differs only in that the constellation points in the similar uniform QAM symbol constellation are uniformly spaced.

28. The communication system of claim **23**, wherein each of the plurality of NU-QAM symbol constellations is capable of providing a greater parallel decoding capacity at a specific SNR than the other NU-QAM symbol constellations in the plurality of NU-QAM symbol constellations at the same SNR.

29. The communication system of claim **23**, wherein the selected NU-QAM 256 point symbol constellation is capable of providing a greater parallel decoding capacity at an SNR of 15.6 dB than the other NU-QAM symbol constellations in the plurality of NU-QAM symbol constellations at an SNR of 15.6 dB.

30. The communication system of claim **23**, wherein each of the plurality of NU-QAM symbol constellations is characterized by the assignment of labels and spacing of constellation points so as to maximize parallel decoding capacity at a specific SNR subject to at least one constraint.

31. The communication system of claim **23**, wherein the receiver is capable of replacing at least one existing symbol constellation with the plurality of NU-QAM symbol constellations by an upgrade to at least one of the receiver software and firmware.

32. The communication system of claim **23**, wherein the selected NU-QAM 256 point symbol constellation is an orthogonalized non-uniform Pulse Amplitude Modulated (NU-PAM) constellation, where the NU-PAM constellation is characterized by assignment of labels and spacing of constellation points in one dimension so as to maximize parallel decoding capacity in an AWGN channel at a specific SNR.

33. The communication system of claim **23**, wherein the selected NU-QAM 256 point symbol constellation is characterized by assignment of labels and spacing of constellation points in two dimensions so as to maximize parallel decoding capacity in an AWGN channel at a specific SNR.

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