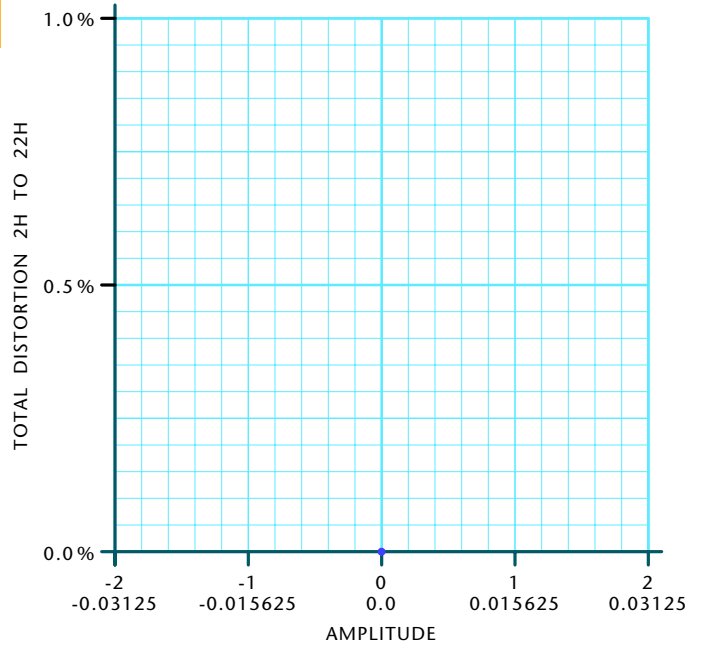# THREE PHASE MAGIC SINEWAVES

768D-16-22-2-00

bits - trans - harms - filt - level

SUMMARY: This delta-friendly sequence has been optimized for very high efficiency, having a maximum of only sixteen transitions per quarter. A second order filter is recommended.

Level: **0 of 64**

Bits in word: **768**

Bits in quarter: **192**

Controlled harmonics: **2 through 22nd**

Filter: **2nd order Butterworth, F = 2.0**

Maximum transitions: **16**

Graph max distortion: **1.0%**

Report max distortion: **1.0%**

Unlikely exclusions: **no**

Verify zero third: **no**

Delta friendly: **yes**

TOTAL DISTORTION 2H TO 22H

AMPLITUDE

-2	-1	0	1	2
-0.03125	-0.015625	0.0	0.015625	0.03125

Amplitude: 0   Power: 0   Distortion: **0.0%**   Transitions: 0   Jitter: 0.0%

One Patterns (start-length): 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0

%000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
 000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000

Hexadecimal: $0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000

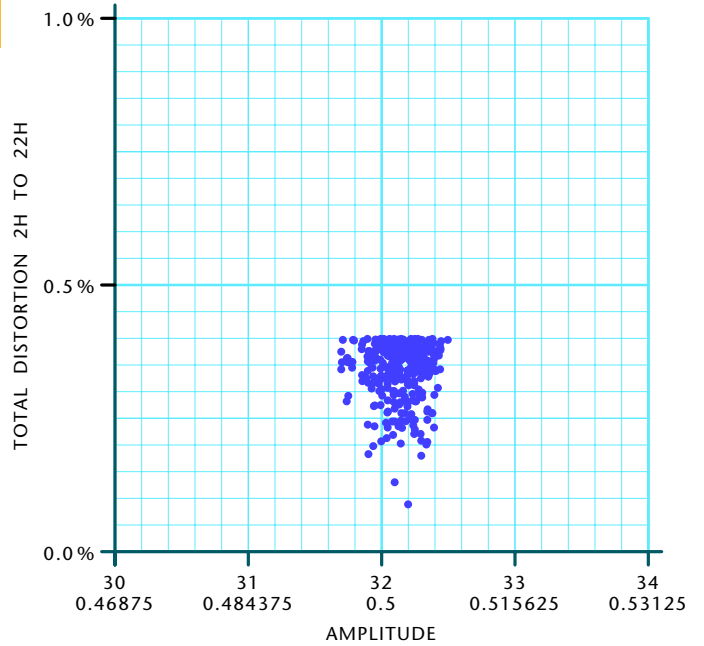| H3 = 0	H5 = 0	H7 = 0	H9 = 0	H11 = 0
H13 = 0	H15 = 0	H17 = 0	H19 = 0	

THREE PHASE MAGIC SINEWAVES

768D-16-22-2-16

bits - trans - harms - filt - level

SUMMARY: This delta-friendly sequence has been optimized for very high efficiency, having a maximum of only sixteen transitions per quarter. A second order filter is recommended.

Level: **16 of 64**

Bits in word: **768**

Bits in quarter: **192**

Controlled harmonics: **2 through 22nd**

Filter: **2nd order Butterworth, F = 2.0**

Maximum transitions: **16**

Graph max distortion: **0.5%**

Report max distortion: **0.31%**

Unlikely exclusions: **yes**

Verify zero third: **no**

Delta friendly: **yes**

Amplitude: 0.253059   Power: 0.0640386   Distortion: **0.305%**   Transitions: 12   Jitter: 4.8%
One Patterns (start-length): 12-1 20-0 45-3 53-0 75-5 108-7 140-8 173-8
%00000000000010000000000000000000000000000000001110000000000000000000000000001111000000000000000000
 00000000000011111110000000000000000000000000011111111000000000000000000000000001111111100000000000
Hexadecimal: $0008 0000 0007 0000 001F 0000 000F E000 000F F000 0007 F800

H3 = 0	H5 = -0.00163381	H7 = 0.000320643	H9 = 0	H11 = -0.00160796
H13 = 0.000945549	H15 = 0	H17 = 0.000773794	H19 = -0.00156632	

Amplitude: 0.253053   Power: 0.0640358   Distortion: **0.306%**   Transitions: 12   Jitter: 4.8%
One Patterns (start-length): 13-1 21-0 44-3 52-0 76-5 107-7 141-8 172-8
%00000000000000100000000000000000000000000000011100000000000000000000000000001111000000000000000000
 00000000000011111110000000000000000000000000011111111000000000000000000000000011111110000000000000
Hexadecimal: $0004 0000 000E 0000 000F 8000 001F C000 0007 F800 000F F000

H3 = 0	H5 = -0.00145103	H7 = -4.05893e-05	H9 = 0	H11 = 0.00161089
H13 = -0.00138209	H15 = 0	H17 = 0.000666918	H19 = -0.00152789	

Amplitude: 0.253035   Power: 0.0640269   Distortion: **0.307%**   Transitions: 12   Jitter: 4.8%
One Patterns (start-length): 13-1 21-0 45-3 53-0 75-5 107-7 141-8 173-8
%00000000000000100000000000000000000000000000011100000000000000000000000000001111000000000000000000
 00000000000011111110000000000000000000000000011111111000000000000000000000000001111111100000000000
Hexadecimal: $0004 0000 0007 0000 001F 0000 001F C000 0007 F800 0007 F800

H3 = 0	H5 = 0.000886451	H7 = -0.00149052	H9 = 0	H11 = 1.95179e-05
H13 = -0.000306303	H15 = 0	H17 = 0.00146005	H19 = -0.00205932	

Amplitude: 0.254676   Power: 0.0648597   Distortion: **0.237%**   Transitions: 14   Jitter: 7.4%
One Patterns (start-length): 13-0 20-1 45-2 52-1 76-5 108-7 141-8 173-8
%00000000000000000001000000000000000000000000011000010000000000000000000001111000000000000000000
 00000000000011111110000000000000000000000000011111111000000000000000000000000001111111100000000000
Hexadecimal: $0000 0800 0006 0800 000F 8000 000F E000 0007 F800 0007 F800

H3 = 0	H5 = 6.07191e-05	H7 = -0.000558044	H9 = 0	H11 = -0.000334293
H13 = 0.000112069	H15 = 0	H17 = 0.000808271	H19 = -0.00213097	

THREE PHASE MAGIC SINEWAVES

768D-16-22-2-32

bits - trans - harms - filt - level

SUMMARY: This delta-friendly sequence has been optimized for very high efficiency, having a maximum of only sixteen transitions per quarter. A second order filter is recommended.

Level: **32 of 64**

Bits in word: **768**

Bits in quarter: **192**

Controlled harmonics: **2 through 22nd**

Filter: **2nd order Butterworth, F = 2.0**

Maximum transitions: **16**

Graph max distortion: **0.4%**

Report max distortion: **0.2%**

Unlikely exclusions: **yes**

Verify zero third: **no**

Delta friendly: **yes**

Amplitude: 0.498039   Power: 0.248043   Distortion: **0.198%**   Transitions: 14   Jitter: -6.2%
One Patterns (start-length): 8-3 24-0 40-3 52-4 76-9 104-13 136-**16** 168-**16**
%000000001110000000000000000000000000000001110000000001111000000000000000000001111111110000000000000
 000000001111111111111000000000000000000011111111111111110000000000000000001111111111111111100000000000
Hexadecimal: $00E0 0000 00E0 0F00 000F F800 00FF F800 00FF FF00 00FF FF00

H3 = 0	H5 = -0.000616724	H7 = 0.000691293	H9 = 0	H11 = 0.000989694
H13 = -0.000463748	H15 = 0	H17 = 0.00136699	H19 = 0.000128437	

Amplitude: 0.49691   Power: 0.246919   Distortion: **0.183%**   Transitions: 14   Jitter: -9.8%
One Patterns (start-length): 7-3 22-0 39-3 52-4 76-10 106-12 135-**15** 167-**17**
%000000011100000000000000000000000000000111000000000011110000000000000000000001111111110000000000000
 000000000011111111111100000000000000000111111111111111000000000000000001111111111111111100000000000
Hexadecimal: $01C0 0000 01C0 0F00 000F FC00 003F FC00 01FF FC00 01FF FF00

H3 = 0	H5 = 0.000901289	H7 = -0.000366282	H9 = 0	H11 = 8.5567e-05
H13 = 0.00099409	H15 = 0	H17 = -0.000403239	H19 = 0.00112551	

Amplitude: 0.503034   Power: 0.253043   Distortion: **0.13%**   Transitions: 14   Jitter: 9.7%
One Patterns (start-length): 8-2 23-0 39-4 53-3 75-10 105-13 136-**15** 167-**17**
%000000001100000000000000000000000000001110000000001110000000000000000001111111110000000000000
 000000000111111111111000000000000000001111111111111111000000000000000011111111111111111100000000000
Hexadecimal: $00C0 0000 01E0 0700 001F F800 007F FC00 00FF FE00 01FF FF00

H3 = 0	H5 = 0.000475205	H7 = -0.00096236	H9 = 0	H11 = 0.000337183
H13 = -0.000304658	H15 = 0	H17 = -0.00056975	H19 = -0.000122493	

Amplitude: 0.506172   Power: 0.25621   Distortion: **0.089%**   Transitions: 16   Jitter: 19.7%
One Patterns (start-length): 8-1 22-1 39-3 52-4 76-10 106-13 136-**15** 167-**17**
%000000001000000000000010000000000000001110000000001110000000000000000001111111110000000000000
 000000000011111111111110000000000000001111111111111111000000000000000011111111111111111100000000000
Hexadecimal: $0080 0200 01C0 0F00 000F FC00 003F FE00 00FF FE00 01FF FF00

H3 = 0	H5 = -0.000181182	H7 = 3.29274e-05	H9 = 0	H11 = -7.47114e-05
H13 = -4.77763e-05	H15 = 0	H17 = -0.000863776	H19 = 8.65508e-05	

Amplitude: 0.509302   Power: 0.259389   Distortion: **0.18%**   Transitions: 14   Jitter: 29.7%
One Patterns (start-length): 8-0 21-2 39-2 51-5 77-10 107-13 136-**15** 167-**17**
%000000000000000000000110000000000000011000000000001111100000000000000001111111110000000000000
 000000000011111111111100000000000000011111111111111100000000000000000011111111111111111100000000000
Hexadecimal: $0000 0600 0180 1F00 0007 FE00 001F FF00 00FF FE00 01FF FF00

H3 = 0	H5 = -0.000659719	H7 = 0.0011358	H9 = 0	H11 = -0.000463733
H13 = 0.000220619	H15 = 0	H17 = -0.00104522	H19 = 0.000432111	

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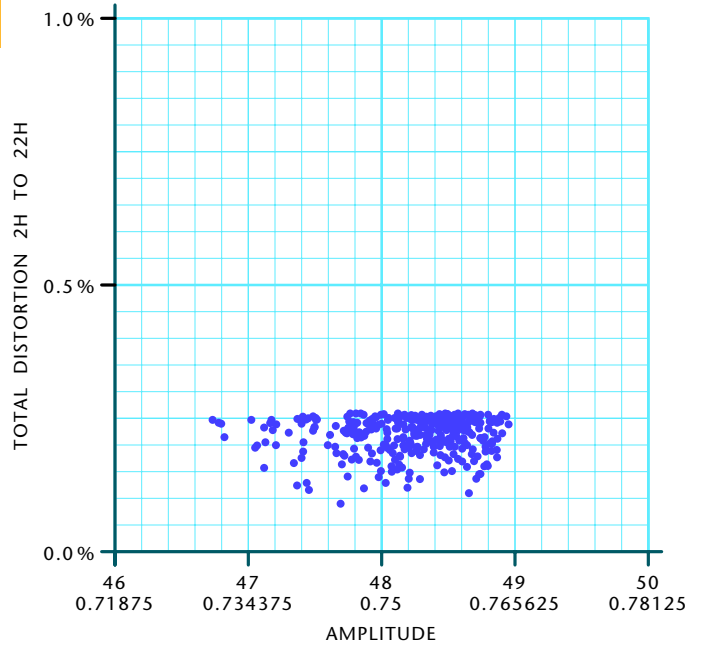
SUMMARY: This delta-friendly sequence has been optimized for very high efficiency, having a maximum of only sixteen transitions per quarter. A second order filter is recommended.

Level: **48 of 64**

Bits in word: **768**

Bits in quarter: **192**

Controlled harmonics: **2 through 22nd**

Filter: **2nd order Butterworth, F = 2.0**

Maximum transitions: **16**

Graph max distortion: **0.26%**

Report max distortion: **0.123%**

Unlikely exclusions: **yes**

Verify zero third: **no**

Delta friendly: **yes**

TOTAL DISTORTION 2H TO 22H

1.0%

0.5%

0.0%

46	47	48	49	50
0.71875	0.734375	0.75	0.765625	0.78125

AMPLITUDE

Amplitude: 0.763646   Power: 0.583155   Distortion: **0.11%**   Transitions: 12   Jitter: 65.4%

One Patterns (start-length): 5-0 24-5 37-0 51-10 77-14 104-19 133-**24** 165-**24**

%000000000000000000000000011110000000000000000000000001111111110000000000000001111111111111100000
 000000001111111111111111110000000001111111111111111111111110000000011111111111111111111111111000

Hexadecimal: $0000 00F8 0000 1FF8 0007 FFE0 00FF FFE0 07FF FFF8 07FF FFF8

H3 = 0	H5 = 0.000624981	H7 = 0.000150318	H9 = 0	H11 = -0.000145574
H13 = 0.00051208	H15 = 0	H17 = 0.000601359	H19 = -0.000395889	

Amplitude: 0.73862   Power: 0.545559   Distortion: **0.116%**   Transitions: 14   Jitter: -54.6%

One Patterns (start-length): 3-5 26-0 35-4 52-8 76-13 102-18 131-**23** 163-**25**

%000111100000000000000000000000000001110000000000000111111100000000000000001111111111110000000
 000000011111111111111111110000000000011111111111111111111111000000000111111111111111111111110000

Hexadecimal: $1F00 0000 1E00 0FF0 000F FF80 03FF FF00 1FFF FFC0 1FFF FFF0

H3 = 0	H5 = -0.00057128	H7 = -6.17587e-05	H9 = 0	H11 = -4.97718e-05
H13 = -1.98255e-06	H15 = 0	H17 = 0.000675755	H19 = 0.000747451	

Amplitude: 0.747253   Power: 0.558388   Distortion: **0.119%**   Transitions: 16   Jitter: -13.1%

One Patterns (start-length): 4-3 25-2 35-3 52-8 76-14 103-18 132-**23** 163-**25**

%000011100000000000000000011000000001110000000000000011111110000000000000001111111111111000000
 000000011111111111111111110000000000011111111111111111111111000000001111111111111111111111110000

Hexadecimal: $0E00 0060 1C00 0FF0 000F FFC0 01FF FF80 0FFF FFE0 1FFF FFF0

H3 = 0	H5 = 0.000582288	H7 = 0.000203446	H9 = 0	H11 = 0.000988193
H13 = -1.2722e-05	H15 = 0	H17 = 0.000203342	H19 = 0.000194643	

Amplitude: 0.743573   Power: 0.552901   Distortion: **0.09%**   Transitions: 14   Jitter: -30.8%

One Patterns (start-length): 3-4 25-0 34-5 53-7 75-14 103-18 131-**22** 162-**26**

%000111100000000000000000000000000001111100000000000011111100000000000001111111111111000000
 000000011111111111111111110000000001111111111111111111111110000000011111111111111111111111110000

Hexadecimal: $1E00 0000 3E00 07F0 001F FF80 01FF FF80 1FFF FF80 3FFF FFF0

H3 = 0	H5 = -0.000231354	H7 = -0.000119189	H9 = 0	H11 = -0.000211835
H13 = 0.00040602	H15 = 0	H17 = -0.000613005	H19 = 0.000397974	

Amplitude: 0.754026   Power: 0.568555   Distortion: **0.12%**   Transitions: 16   Jitter: 19.3%

One Patterns (start-length): 4-2 25-1 34-5 53-7 75-14 103-19 132-**22** 162-**26**

%000011000000000000000000010000000111110000000000001111111000000000000001111111111111000000
 000000011111111111111111110000000001111111111111111111111110000000011111111111111111111111110000

Hexadecimal: $0C00 0040 3E00 07F0 001F FF80 01FF FFC0 0FFF FFC0 3FFF FFF0

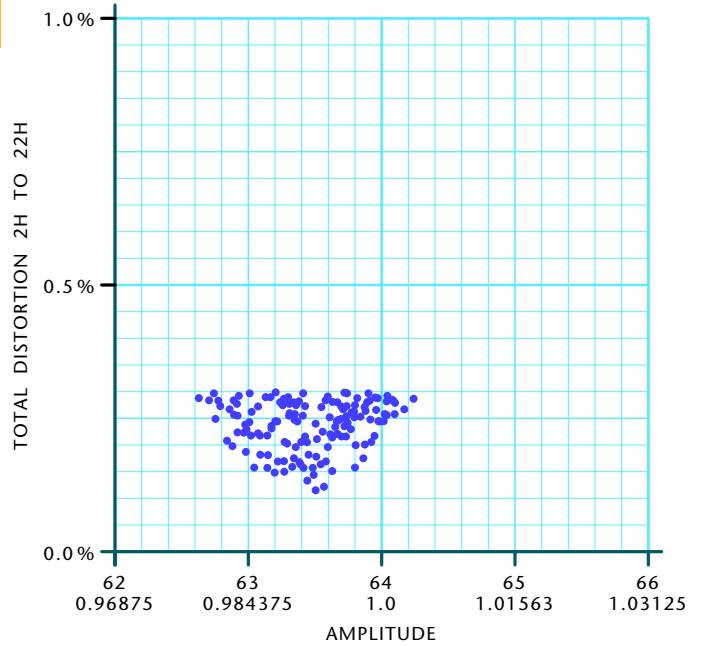| H3 = 0	H5 = 0.000368304	H7 = 0.000669406	H9 = 0	H11 = 2.19755e-05
H13 = -0.000189349	H15 = 0	H17 = -0.000880888	H19 = -0.000222246	

THREE PHASE MAGIC SINEWAVES

768D-16-22-2-64

bits - trans - harms - filt - level

SUMMARY: This delta-friendly sequence has been optimized for very high efficiency, having a maximum of only sixteen transitions per quarter. A second order filter is recommended.

Level: **64 of 64**

Bits in word: **768**

Bits in quarter: **192**

Controlled harmonics: **2 through 22nd**

Filter: **2nd order Butterworth, F = 2.0**

Maximum transitions: **16**

Graph max distortion: **0.3%**

Report max distortion: **0.147%**

Unlikely exclusions: **yes**

Verify zero third: **no**

Delta friendly: **yes**

Amplitude: 0.993236   Power: 0.986517   Distortion: **0.122%**   Transitions: 10   Jitter: -43.2%
One Patterns (start-length): 0-4 28-4 32-3 52-12 76-17 100-24 128-**32** 160-**32**
%1111000000000000000000000001111111000000000000000001111111111100000000000001111111111111111000
00001111111111111111111111111110001111111111111111111111111111111111111111111111111111111111111111
Hexadecimal: $F000 000F E000 0FFF 000F FFF8 0FFF FFF0 FFFF FFFF FFFF FFFF

H3 = 0	H5 = -0.000828691	H7 = 0.000454247	H9 = 0	H11 = 0.000465322
H13 = -0.000459008	H15 = 0	H17 = 0.000134433	H19 = -0.000408253	

Amplitude: 0.99227   Power: 0.984599   Distortion: **0.115%**   Transitions: 10   Jitter: -49.4%
One Patterns (start-length): 0-4 27-5 32-2 52-12 76-18 101-23 128-**32** 160-**32**
%1111000000000000000000000001111110000000000000000001111111111100000000000001111111111111111100
00000111111111111111111111111110001111111111111111111111111111111111111111111111111111111111111111
Hexadecimal: $F000 001F C000 0FFF 000F FFFC 07FF FFF0 FFFF FFFF FFFF FFFF

H3 = 0	H5 = -0.000649881	H7 = 0.0002699	H9 = 0	H11 = 0.000832516
H13 = -0.000167462	H15 = 0	H17 = 0.000105745	H19 = -0.000324136	

Amplitude: 0.991306   Power: 0.982688   Distortion: **0.133%**   Transitions: 10   Jitter: -55.6%
One Patterns (start-length): 0-4 26-6 32-1 52-12 76-19 102-22 128-**32** 160-**32**
%1111000000000000000000000001111111000000000000000001111111111100000000000001111111111111111110
00000011111111111111111111111110001111111111111111111111111111111111111111111111111111111111111111
Hexadecimal: $F000 003F 8000 0FFF 000F FFFE 03FF FFF0 FFFF FFFF FFFF FFFF

H3 = 0	H5 = -0.000503617	H7 = 5.34532e-05	H9 = 0	H11 = 0.00120466
H13 = 0.000111033	H15 = 0	H17 = 0.000109704	H19 = -0.000211328	

Amplitude: 0.992051   Power: 0.984165   Distortion: **0.144%**   Transitions: 10   Jitter: -50.8%
One Patterns (start-length): 0-4 26-6 32-0 50-14 78-18 102-22 128-**32** 160-**32**
%1111000000000000000000000001111110000000000000000001111111111110000000000001111111111111111111
00000011111111111111111111111110001111111111111111111111111111111111111111111111111111111111111111
Hexadecimal: $F000 003F 0000 3FFF 0003 FFFF 03FF FFF0 FFFF FFFF FFFF FFFF

H3 = 0	H5 = -0.000349528	H7 = 0.000618219	H9 = 0	H11 = 0.000279855
H13 = -0.000822462	H15 = 0	H17 = 0.000835734	H19 = 0.000348725	

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