

Appendix A1. Fourier Spectra Data
June 2005

Grady

Spectral Data for Figure 2.1,
120V PC Current

Harmonic	Mag - %	Ang - Sine Deg.	Harmonic	Mag - %	Ang - Sine Deg.
1	100.00	5	2		
3	88.90	-177	4		
5	73.60	5	6		
7	54.40	-173	8		
9	35.60	9	10		
11	19.00	-167	12		
13	7.40	20	14		
15	1.00	-88	16		
17	2.80	180	18		
19	3.20	13	20		
21	2.40	-157	22		
23	1.90	43	24		
25	1.80	-119	26		
27	1.90	67	28		
29	2.00	-110	30		
31	1.60	75	32		
33	1.00	-85	34		
35	0.80	160	36		
37	1.20	23	38		
39	1.50	-140	40		
41	1.30	54	42		
43	0.70	-111	44		
45	0.50	142	46		
47	0.70	15	48		
49	0.80	-157	50		

Spectral Data for Figure 3.3 (Top),
Idealized Six-Pulse Current-Source ASD Current

Harmonic	Mag - %	Ang - Sine Deg.	Harmonic	Mag - %	Ang - Sine Deg.
1	100.00	0	2		
3			4		
5	20.00	180	6		
7	14.29	180	8		
9			10		
11	9.09	0	12		
13	7.69	0	14		
15			16		
17	5.88	180	18		
19	5.26	180	20		
21			22		
23	4.35	0	24		
25	4.00	0	26		
27			28		
29	3.45	180	30		
31	3.23	180	32		
33			34		
35	2.86	0	36		
37	2.70	0	38		
39			40		
41	2.44	180	42		
43	2.33	180	44		
45			46		
47	2.13	0	48		
49	2.04	0	50		

Appendix A1. Fourier Spectra Data
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Spectral Data for Figure 3.3 (Bottom Left),
Idealized Six-Pulse Current-Source ASD Current with 30° Shift

Harmonic	Mag - %	Ang - Sine Deg.	Harmonic	Mag - %	Ang - Sine Deg.
1	100.00	0	2		
3			4		
5	20.00	0	6		
7	14.29	0	8		
9			10		
11	9.09	0	12		
13	7.69	0	14		
15			16		
17	5.88	0	18		
19	5.26	0	20		
21			22		
23	4.35	0	24		
25	4.00	0	26		
27			28		
29	3.45	0	30		
31	3.23	0	32		
33			34		
35	2.86	0	36		
37	2.70	0	38		
39			40		
41	2.44	0	42		
43	2.33	0	44		
45			46		
47	2.13	0	48		
49	2.04	0	50		

Spectral Data for Figure 3.3 (Left),
Idealized Twelve-Pulse Current-Source ASD Current

Harmonic	Mag - %	Ang - Sine Deg.	Harmonic	Mag - %	Ang - Sine Deg.
1	100.00	0	2		
3			4		
5			6		
7			8		
9			10		
11	9.09	0	12		
13	7.69	0	14		
15			16		
17			18		
19			20		
21			22		
23	4.35	0	24		
25	4.00	0	26		
27			28		
29			30		
31			32		
33			34		
35	2.86	0	36		
37	2.70	0	38		
39			40		
41			42		
43			44		
45			46		
47	2.13	0	48		
49	2.04	0	50		

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Spectral Data for Figure 4.1,
25kV/240V Transformer Magnetizing Current

Harmonic	Mag - %	Ang - Sine Deg.	Harmonic	Mag - %	Ang - Sine Deg.
1	100.00	-66	2		
3	63.50	-69	4		
5	35.90	-70	6		
7	18.30	-69	8		
9	10.10	-73	10		
11	5.40	-78	12		
13	2.10	-80	14		
15	0.90	-101	16		
17	0.40	-96	18		
19	0.10	-90	20		
21			22		
23	0.20	-91	24		
25	0.20	-174	26		
27	0.10	126	28		
29			30		
31	0.20	21	32		
33	0.20	99	34		
35			36		
37	0.10	-44	38		
39			40		
41			42		
43	0.30	-90	44		
45			46		
47	0.40	64	48		
49	0.20	-165	50		

Spectral Data for Figure 4.2,
120V Refrigerator Current

Harmonic	Mag - %	Ang - Sine Deg.	Harmonic	Mag - %	Ang - Sine Deg.
1	100.00	-31	2	3.50	-48
3	5.10	101	4	0.40	98
5	0.50	124	6	0.30	152
7	1.00	10	8	0.20	55
9	0.40	-57	10		
11	0.20	-103	12		
13	0.20	-180	14		
15	0.10	129	16		
17			18		
19			20		
21			22		
23			24		
25			26		
27			28		
29			30		
31			32		
33			34		
35			36		
37			38		
39			40		
41			42		
43			44		
45			46		
47			48		
49			50		

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Spectral Data for Figure 4.3,
240V Residential Air Conditioner Current

Harmonic	Mag - %	Ang - Sine Deg.	Harmonic	Mag - %	Ang - Sine Deg.
1	100.00	-23	2		
3	8.00	110	4		
5	6.80	58	6		
7	0.50	165	8		
9	0.60	82	10		
11	0.30	157	12		
13			14		
15			16		
17	0.20	87	18		
19			20		
21			22		
23			24		
25			26		
27			28		
29			30		
31			32		
33			34		
35			36		
37			38		
39			40		
41			42		
43			44		
45			46		
47			48		
49			50		

Spectral Data for Figure 4.4,
277V Fluorescent Lamp Current (with Magnetic Ballast)

Harmonic	Mag - %	Ang - Sine Deg.	Harmonic	Mag - %	Ang - Sine Deg.
1	100.00	-2	2	2.00	-117
3	15.80	-150	4	0.40	168
5	8.60	-128	6	0.30	47
7	2.90	-73	8	0.10	8
9	2.00	-32	10		
11	1.40	6	12		
13	0.80	29	14	0.20	-49
15	0.40	32	16		
17	0.20	-17	18		
19	0.50	-56	20		
21	0.40	-49	22	0.20	-133
23	0.20	-65	24		
25			26		
27	0.10	162	28		
29			30		
31			32		
33			34	0.10	-166
35	0.10	-42	36		
37			38		
39			40	0.10	149
41			42		
43			44		
45			46		
47	0.10	-137	48	0.20	25
49			50		

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Spectral Data for Figure 4.6 (Top Left),
Six-Pulse Voltage-Source ASD Current (High Power)

Harmonic	Mag - %	Ang - Sine Deg.	Harmonic	Mag - %	Ang - Sine Deg.
1	100.00	0	2		
3			4		
5	29.81	180	6		
7	3.22	180	8		
9			10		
11	8.95	0	12		
13	3.12	0	14		
15			16		
17	5.05	180	18		
19	2.52	180	20		
21			22		
23	3.48	0	24		
25	2.07	0	26		
27			28		
29	2.64	180	30		
31	1.75	180	32		
33			34		
35	2.13	0	36		
37	1.51	0	38		
39			40		
41	1.78	180	42		
43	1.33	180	44		
45			46		
47	1.53	0	48		
49	1.18	0	50		

Spectral Data for Figure 4.6 (Top Right),
Six-Pulse Voltage-Source ASD Current (Low Power)

Harmonic	Mag - %	Ang - Sine Deg.	Harmonic	Mag - %	Ang - Sine Deg.
1	100	0	2		
3			4		
5	58.89	180	6		
7	30.78	0	8		
9			10		
11	5.3	0	12		
13	8.64	180	14		
15			16		
17	0.34	0	18		
19	3.04	0	20		
21			22		
23	1.43	180	24		
25	0.85	180	26		
27			28		
29	1.48	0	30		
31	0.14	180	32		
33			34		
35	1.2	180	36		
37	0.55	0	38		
39			40		
41	0.84	0	42		
43	0.67	180	44		
45			46		
47	0.49	180	48		
49	0.61	0	50		

Appendix A1. Fourier Spectra Data
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Spectral Data for Figure 4.6 (Bottom Left),
Six-Pulse Voltage-Source ASD Current (High Power)
with 30° Shift

Harmonic	Mag - %	Ang - Sine Deg.	Harmonic	Mag - %	Ang - Sine Deg.
1	100.00	0	2		
3			4		
5	29.81	0	6		
7	3.22	0	8		
9			10		
11	8.95	0	12		
13	3.12	0	14		
15			16		
17	5.05	0	18		
19	2.52	0	20		
21			22		
23	3.48	0	24		
25	2.07	0	26		
27			28		
29	2.65	0	30		
31	1.75	0	32		
33			34		
35	2.13	0	36		
37	1.51	0	38		
39			40		
41	1.78	0	42		
43	1.33	0	44		
45			46		
47	1.53	0	48		
49	1.18	0	50		

Spectral Data for Figure 4.6 (Bottom Right),
Six-Pulse Voltage-Source ASD Current (Low Power)
with 30° Shift

Harmonic	Mag - %	Ang - Sine Deg.	Harmonic	Mag - %	Ang - Sine Deg.
1	100.00	0	2		
3			4		
5	58.89	0	6		
7	30.78	180	8		
9			10		
11	5.30	0	12		
13	8.64	180	14		
15			16		
17	0.34	180	18		
19	3.04	180	20		
21			22		
23	1.43	180	24		
25	0.85	180	26		
27			28		
29	1.48	180	30		
31	0.14	0	32		
33			34		
35	1.20	180	36		
37	0.55	0	38		
39			40		
41	0.84	180	42		
43	0.67	0	44		
45			46		
47	0.49	180	48		
49	0.61	0	50		

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Spectral Data for Figure 4.8,
120V Microwave Oven Current

Harmonic	Mag - %	Ang - Sine Deg.	Harmonic	Mag - %	Ang - Sine Deg.
1	100.00	-3	2	11.60	-102
3	27.80	-149	4	1.10	97
5	9.50	-61	6	1.50	-109
7	3.30	-46	8		
9	1.90	45	10	0.30	-78
11	1.10	139	12	0.20	-21
13	0.90	-144	14	0.10	68
15	0.60	-60	16	0.10	156
17	0.50	17	18		
19	0.40	88	20		
21	0.30	162	22		
23	0.30	-121	24		
25	0.30	-45	26		
27	0.20	25	28		
29	0.20	103	30		
31	0.20	-174	32		
33	0.20	-111	34		
35	0.20	-47	36		
37	0.10	39	38		
39	0.20	114	40		
41	0.10	-7	42		
43	0.10	-126	44		
45	0.10	-43	46		
47			48		
49			50		

Spectral Data for Figure 4.9,
120V Vacuum Cleaner Current

Harmonic	Mag - %	Ang - Sine Deg.	Harmonic	Mag - %	Ang - Sine Deg.
1	100.00	-18	2	0.40	97
3	25.70	132	4	0.70	-118
5	2.70	-70	6	0.20	79
7	1.80	-126	8	0.30	-74
9	0.40	112	10		
11	0.60	-33	12		
13			14		
15	0.20	123	16		
17			18		
19			20		
21			22		
23			24		
25			26	0.10	63
27			28		
29			30		
31			32		
33	0.20	147	34		
35	0.20	-76	36		
37			38		
39			40		
41			42		
43			44		
45			46		
47			48		
49			50		

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Spectral Data for Figure 4.10,
277V Fluorescent Lamp Current (with Electronic Ballast)

Harmonic	Mag - %	Ang - Sine Deg.	Harmonic	Mag - %	Ang - Sine Deg.
1	100.00	4	2	0.20	32
3	7.30	-166	4	0.40	111
5	8.00	-1	6	0.30	84
7	3.00	-3	8	0.20	67
9	0.20	-85	10	0.10	86
11	1.40	-165	12	0.10	60
13	1.10	176	14	0.30	60
15	0.90	-168	16	0.20	-65
17	0.40	-164	18	0.10	19
19	0.30	-59	20		
21	0.70	-32	22	0.20	61
23	0.30	-39	24	0.30	162
25	0.40	-54	26	0.30	-87
27	0.20	-39	28	0.40	95
29	0.20	-73	30		
31	0.30	-136	32	0.10	-81
33	0.60	-128	34		
35	0.40	-126	36	0.10	0
37	0.30	-149	38	0.10	148
39	0.20	-112	40	0.20	102
41	0.50	-130	42		
43	0.40	-140	44	0.20	93
45	0.60	156	46	0.20	51
47	0.30	177	48	0.20	-130
49	0.30	177	50		

Spectral Data for Figure 5.9,
Voltage at 120V Service Panel for PC Workstations

Harmonic	Mag - %	Ang - Sine Deg.	Harmonic	Mag - %	Ang - Sine Deg.
1	100.00	0	2		
3	2.20	53	4		
5	3.90	-150	6		
7	1.40	-28	8		
9	0.60	54	10		
11	0.90	-176	12		
13	0.50	-60	14		
15	0.50	25	16		
17	0.50	139	18		
19	0.30	-126	20		
21	0.30	-12	22		
23	0.30	112	24		
25	0.30	-155	26		
27	0.40	-47	28		
29	0.40	38	30		
31	0.40	134	32		
33	0.30	-118	34		
35	0.40	-44	36		
37	0.20	78	38		
39	0.40	161	40		
41	0.40	-102	42		
43	0.40	-39	44		
45	0.20	35	46		
47	0.20	163	48		
49	0.20	-127	50		

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Spectral Data for Figure 5.10,
480V Service Entrance Current for College of Business
Administration, U. T. Austin

Harmonic	Mag - %	Ang - Sine Deg.	Harmonic	Mag - %	Ang - Sine Deg.
1	100.00	-27	2	0.10	0
3	3.50	-91	4	0.10	-42
5	4.50	-146	6	0.00	0
7	3.70	-48	8	0.10	61
9	0.40	41	10	0.10	145
11	1.00	10	12	0.10	-30
13	0.70	138	14	0.10	-134
15	0.00	0	16	0.20	38
17	0.40	-104	18	0.00	0
19	0.30	-80	20	0.00	0
21	0.00	0	22	0.00	0
23	0.20	-153	24	0.00	0
25	0.00	0	26	0.10	54
27	0.00	0	28	0.20	173
29	0.40	-165	30	0.10	-67
31	0.20	141	32	0.00	0
33	0.00	0	34	0.00	0
35	0.00	0	36	0.10	-162
37	0.00	0	38	0.00	0
39	0.10	143	40	0.10	6
41	0.20	93	42	0.20	58
43	0.00	0	44	0.20	-99
45	0.30	126	46	0.10	176
47	0.00	0	48	0.00	0
49	0.20	176	50	0.10	169