Izveštaj sa laboratorijske vežbe

Dvanaestoimpulsni ispravljač

sample

4. juni 2013
12:18

Sadržaj

1 Prazan hod, $I_{OUT} = 0$

Tabela 1: No load, input

phase	1	2	3
$V_{k\,RMS}$ [V]	14.77	14.66	14.68
$I_{k\,RMS}$ [A]	0.76	0.63	1.02
P_k [W]	−2.87	3.50	2.75
S_k [VA]	11.20	9.24	14.96

$$P_{IN,\,open} = 3.37\,\mathrm{W}$$

Tabela 2: No load, transformer A

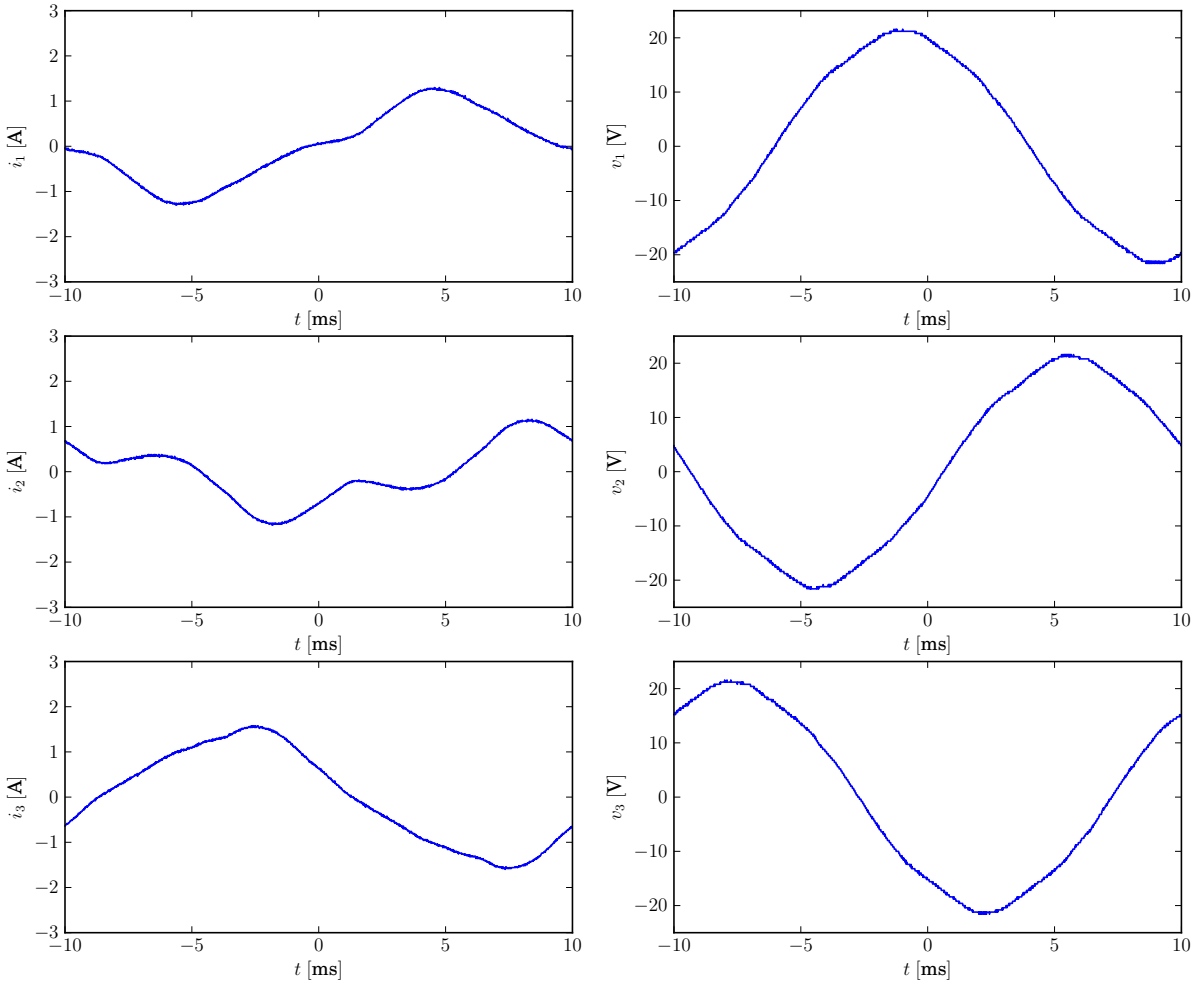
phase	1	2	3
$V_{k\,RMS}$ [V]	14.79	14.64	14.69
$I_{TA\,k\,RMS}$ [A]	0.31	0.45	0.59
$P_{TA\,k}$ [W]	−1.59	3.39	0.05
$S_{TA\,k}$ [VA]	4.63	6.63	8.63

$$P_{TA,\,open} = 1.85\,\mathrm{W}$$

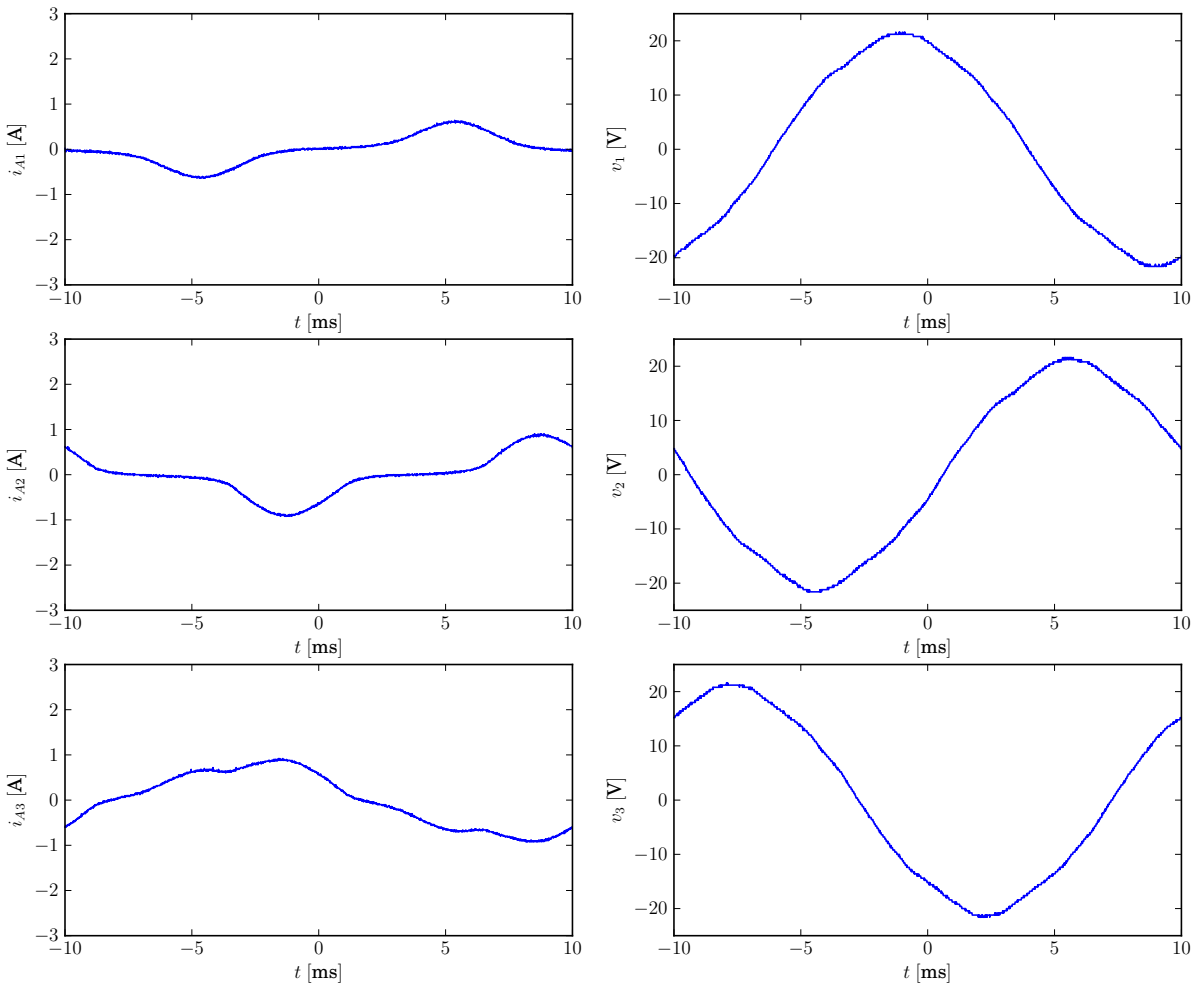
Tabela 3: No load, transformer B

phase	1	2	3
$V_{k\,RMS}$ [V]	14.81	14.65	14.66
$I_{TB\,k\,RMS}$ [A]	0.49	0.26	0.47
$P_{TB\,k}$ [W]	−1.51	0.21	2.84
$S_{TB\,k}$ [VA]	7.29	3.76	6.94

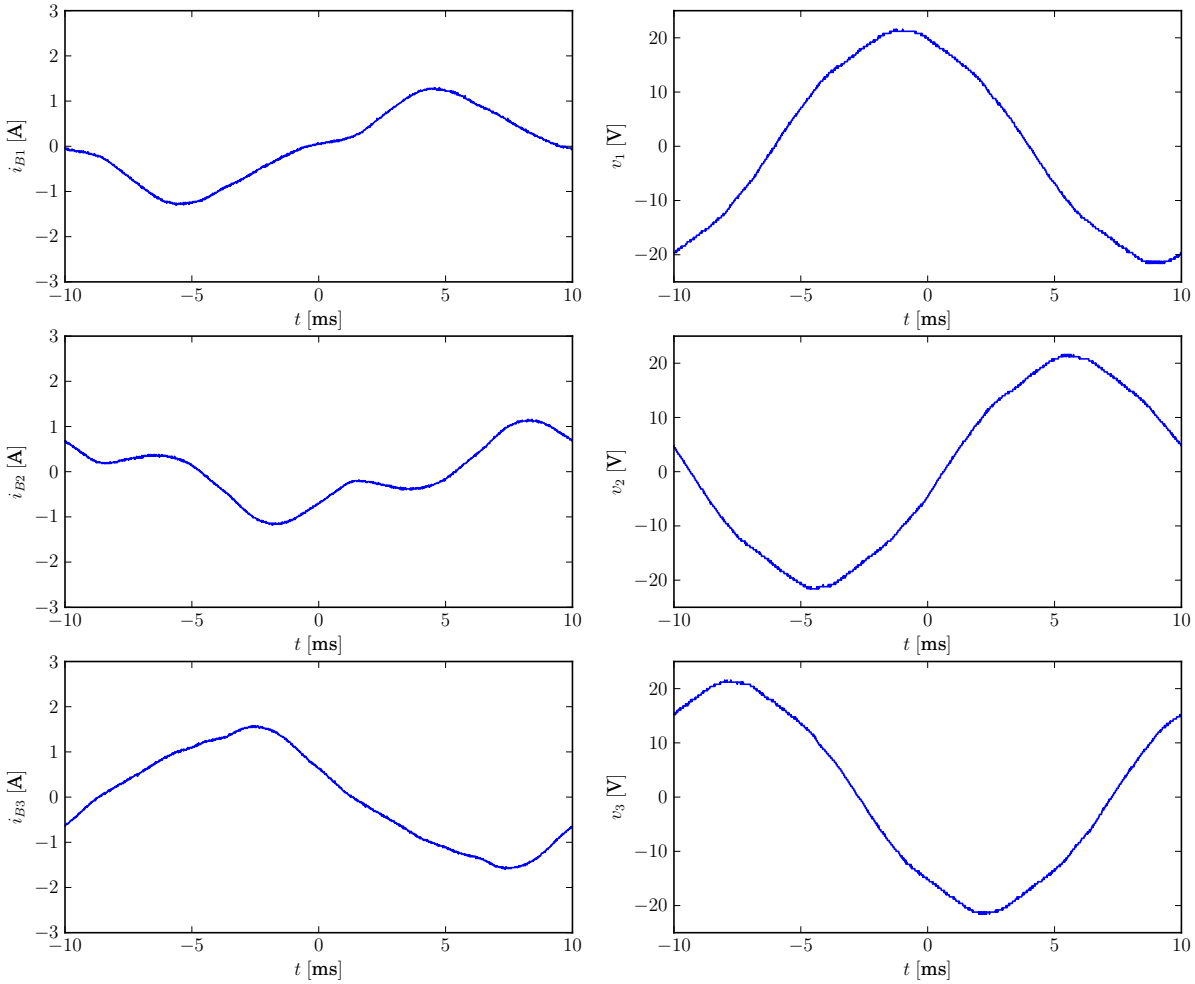
$$P_{TB,\,open} = 1.54\,\mathrm{W}$$



Slika 1: Input waveforms, no load.

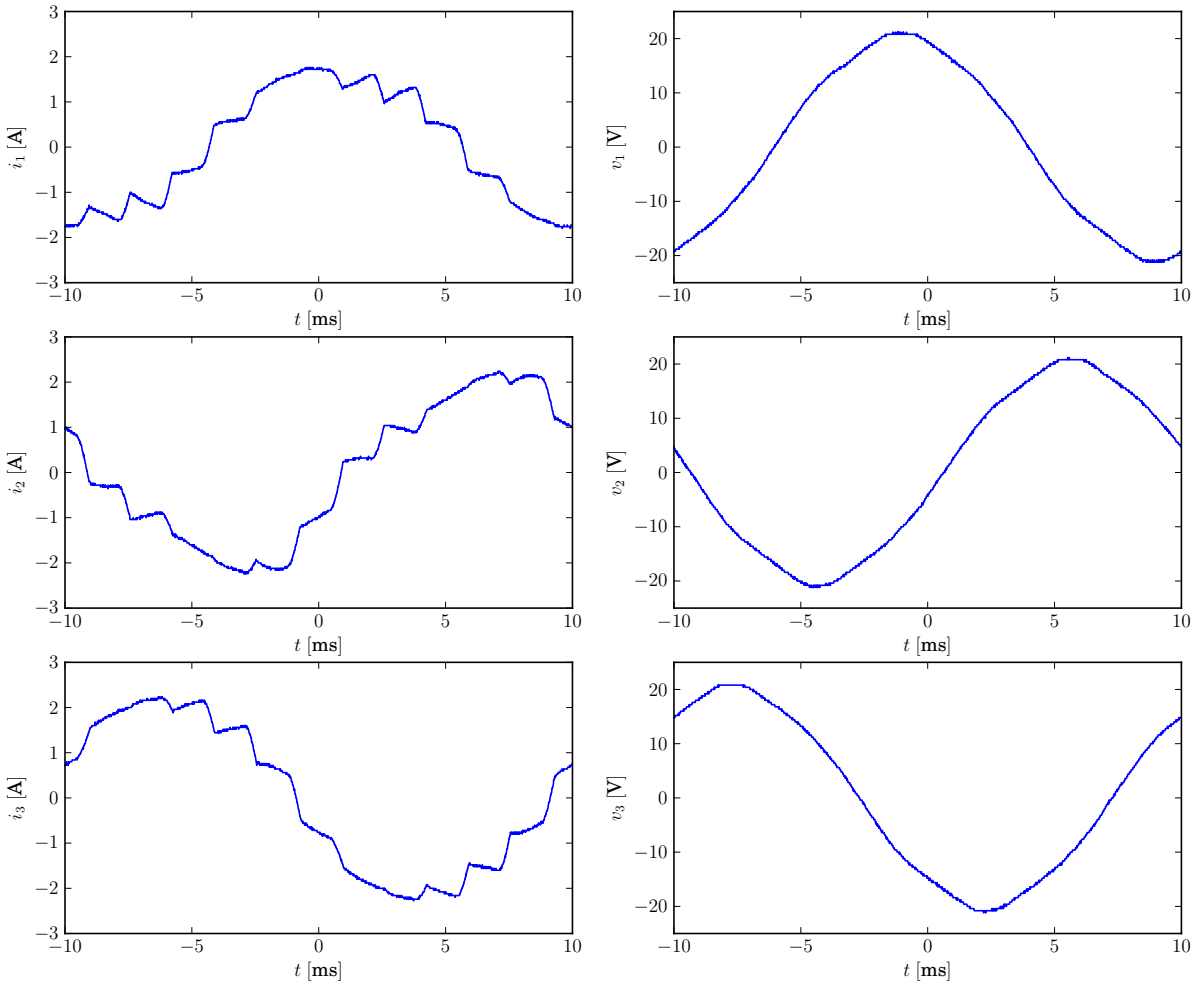


Slika 2: Transformer A waveforms, no load.



Slika 3: Transformer B waveforms, no load.

2 Analiza za $I_{OUT} = 0.7\,\mathrm{A}$



Slika 4: Input waveforms, $I_{OUT} = 0.7\,\mathrm{A}$.

Tabela 4: $I_{OUT} = 0.7\,\mathrm{A}$, input

phase	1	2	3
$V_{k\,RMS}$ [V]	14.51	14.34	14.34
$THD\,(v_k)$ [%]	3.10	3.15	3.09
$I_{k\,RMS}$ [A]	1.24	1.49	1.59
$THD\,(i_k)$ [%]	15.34	16.98	10.73
P_k [W]	15.61	20.06	19.44
S_k [VA]	17.98	21.30	22.82
PF_k	0.8685	0.9421	0.8519
DPF_k	0.8783	0.9553	0.8575

Tabela 5: $I_{OUT} = 0.7\,\mathrm{A}$, transformer A

phase	1	2	3
$V_{k\,RMS}$ [V]	14.51	14.34	14.34
$THD\,(v_k)$ [%]	3.00	2.95	3.36
$I_{TA\,k\,RMS}$ [A]	0.60	0.86	0.77
$THD\,(i_{TA\,k})$ [%]	30.75	27.62	21.92
$P_{TA\,k}$ [W]	7.82	11.24	8.69
$S_{TA\,k}$ [VA]	8.75	12.33	11.11
$PF_{TA\,k}$	0.8934	0.9121	0.7820
$DPF_{TA\,k}$	0.9313	0.9434	0.7972

Tabela 6: $I_{OUT} = 0.7\,\mathrm{A}$, transformer B

phase	1	2	3
$V_{k\,RMS}$ [V]	14.47	14.39	14.36
$THD\,(v_k)$ [%]	3.17	3.22	3.17
$I_{TB\,k\,RMS}$ [A]	0.67	0.68	0.85
$THD\,(i_{TB\,k})$ [%]	26.68	33.19	23.03
$P_{TB\,k}$ [W]	7.66	8.92	10.78
$S_{TB\,k}$ [VA]	9.75	9.78	12.20
$PF_{TB\,k}$	0.7853	0.9118	0.8836
$DPF_{TB\,k}$	0.8156	0.9648	0.9104

Tabela 7: $I_{OUT} = 0.7\,\mathrm{A}$, rectifier A

phase	1	2	3
$V_{A\,k\,RMS}$ [V]	13.80	13.80	13.70
$THD\,(v_{A\,k})$ [%]	3.29	3.73	3.86
$I_{RA\,k\,RMS}$ [A]	0.61	0.61	0.61
$THD\,(i_{RA\,k})$ [%]	27.40	27.81	28.54
$P_{RA\,k}$ [W]	8.10	8.07	7.98
$S_{RA\,k}$ [VA]	8.41	8.41	8.32
$PF_{RA\,k}$	0.9632	0.9597	0.9600
$DPF_{RA\,k}$	0.9995	0.9993	0.9983

Tabela 8: $I_{OUT} = 0.7\,\mathrm{A}$, rectifier B

phase	1	2	3
$V_{B\,k\,RMS}$ [V]	14.13	13.90	13.84
$THD\,(v_{B\,k})$ [%]	4.47	5.07	4.89
$I_{RB\,k\,RMS}$ [A]	0.61	0.61	0.61
$THD\,(i_{RB\,k})$ [%]	27.56	27.82	28.25
$P_{RB\,k}$ [W]	8.24	8.02	7.98
$S_{RB\,k}$ [VA]	8.64	8.42	8.39
$PF_{RB\,k}$	0.9536	0.9517	0.9510
$DPF_{RB\,k}$	0.9987	0.9994	0.9987

Tabela 9: $I_{OUT} = 0.7\,\mathrm{A}$, output

output	rectifier A	rectifier B	complete output
I_{OUT} [A]	0.76	0.76	0.75
V_{OUT} [V]	32.28	32.67	63.04
P_{OUT} [W]	24.52	24.39	47.11

Snage:

1. $P_{IN} = 55.12\,\mathrm{W}$
2. $P_{TA} = 27.75\,\mathrm{W}$
3. $P_{TB} = 27.35\,\mathrm{W}$
4. $P_{RA} = 24.15\,\mathrm{W}$
5. $P_{RB} = 24.24\,\mathrm{W}$
6. $P_{OUTA} = 24.52\,\mathrm{W}$
7. $P_{OUTB} = 24.39\,\mathrm{W}$
8. $P_{OUT} = 47.11\,\mathrm{W}$

Gubici:

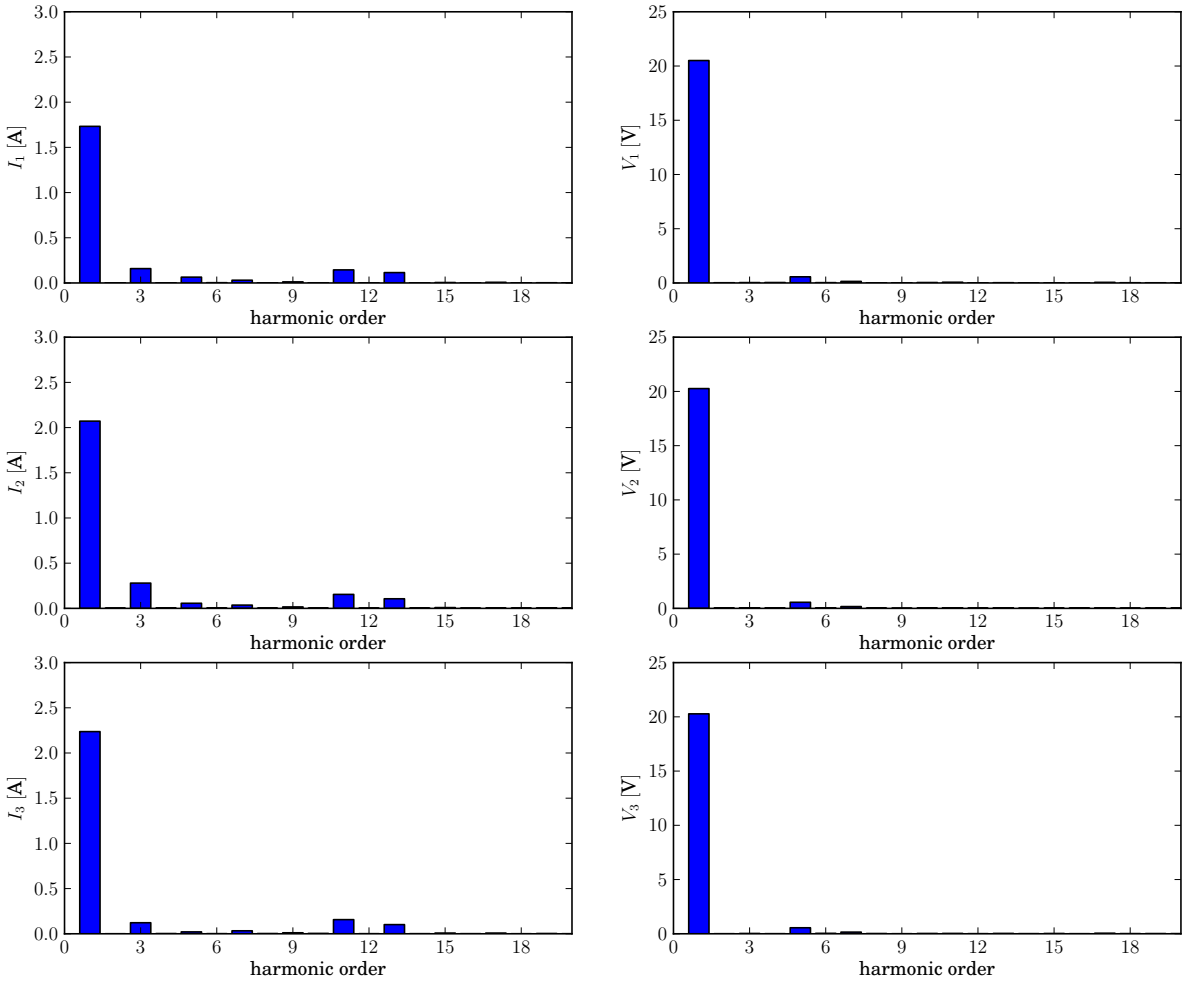
1. $P_{loss\,TA} = 3.60\,\mathrm{W}$
2. $P_{loss\,TB} = 3.11\,\mathrm{W}$
3. $P_{loss\,RA} = -0.37\,\mathrm{W}$
4. $P_{loss\,RB} = -0.15\,\mathrm{W}$
5. $P_{loss} = P_{IN} - P_{OUT} = 8.01\,\mathrm{W}$

Koeficijenti korisnog dejstva:

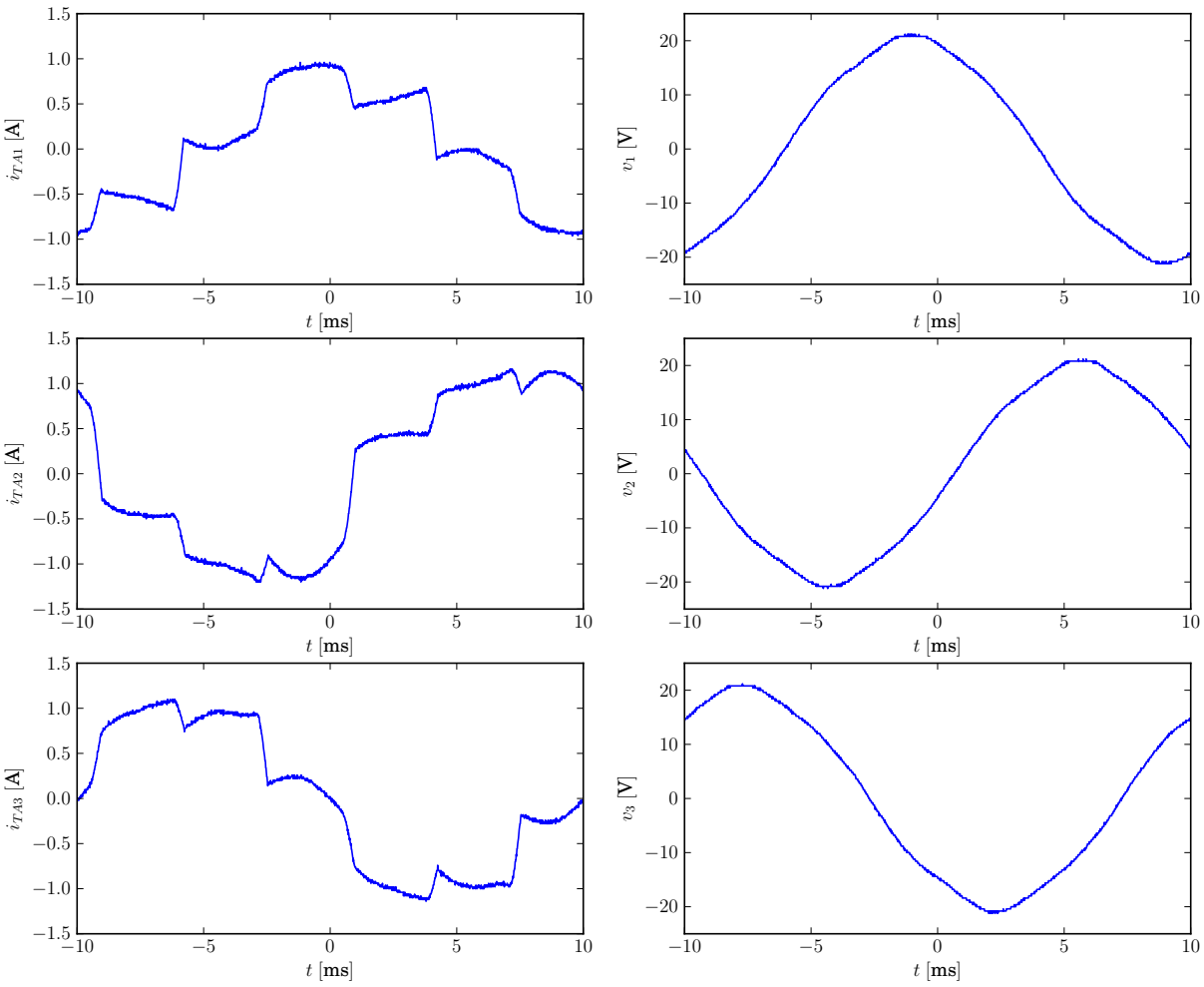
1. $\eta_{TA} = 87.03\%$
2. $\eta_{TB} = 88.62\%$
3. $\eta_{RA} = 101.52\%$
4. $\eta_{RB} = 100.62\%$
5. $\eta = 85.47\%$

Nekonzistentnosti u snagama:

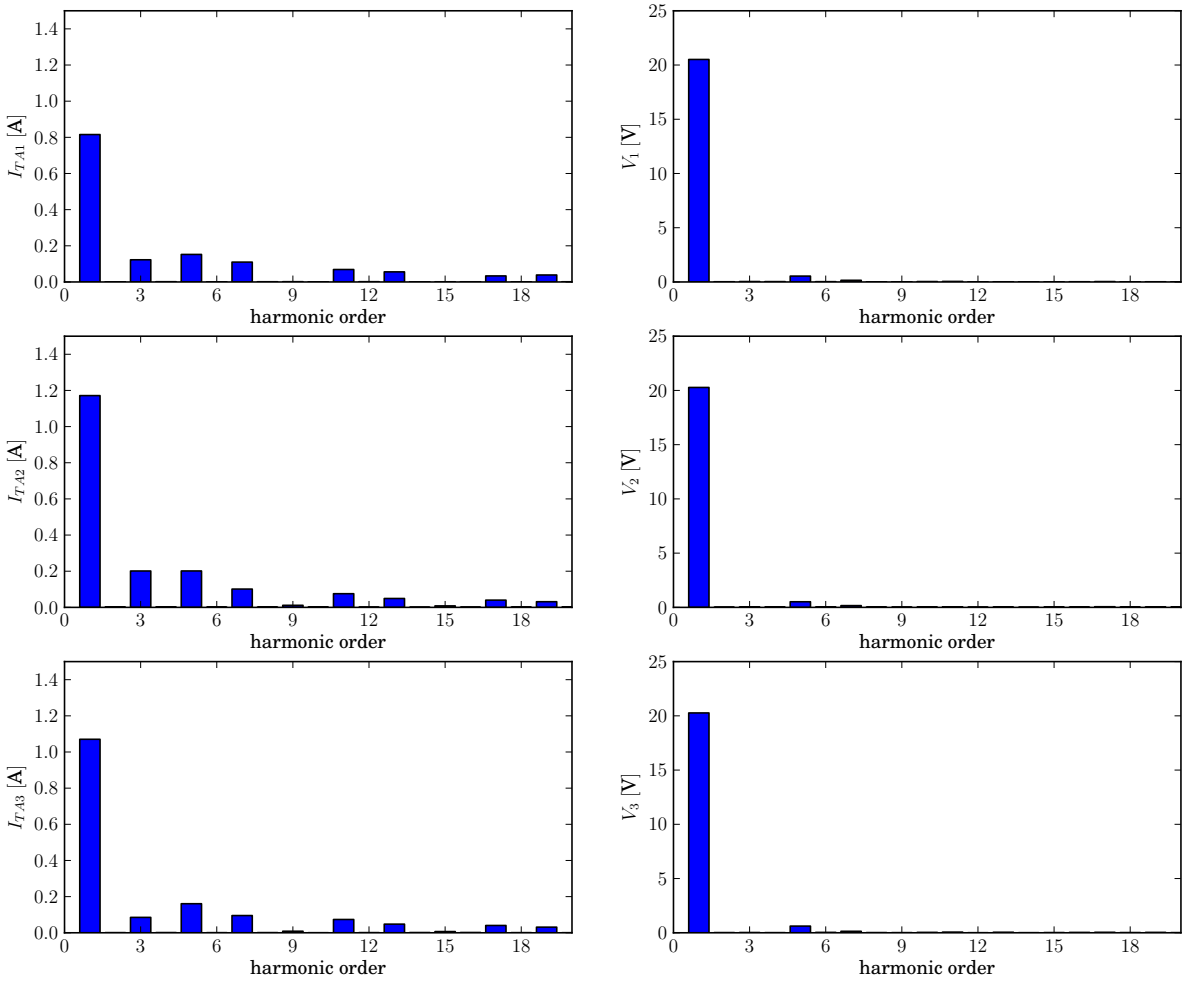
1. $\Delta P_{IN} = P_{IN} - P_{TA} - P_{TB} = 0.01\,\mathrm{W}$
2. $\Delta P_{OUT} = P_{OUT} - P_{OUTA} - P_{OUTB} = -1.80\,\mathrm{W}$
3. $\Delta P_{loss} = P_{IN} - P_{OUT} - \Sigma P_{loss} = 1.82\,\mathrm{W}$



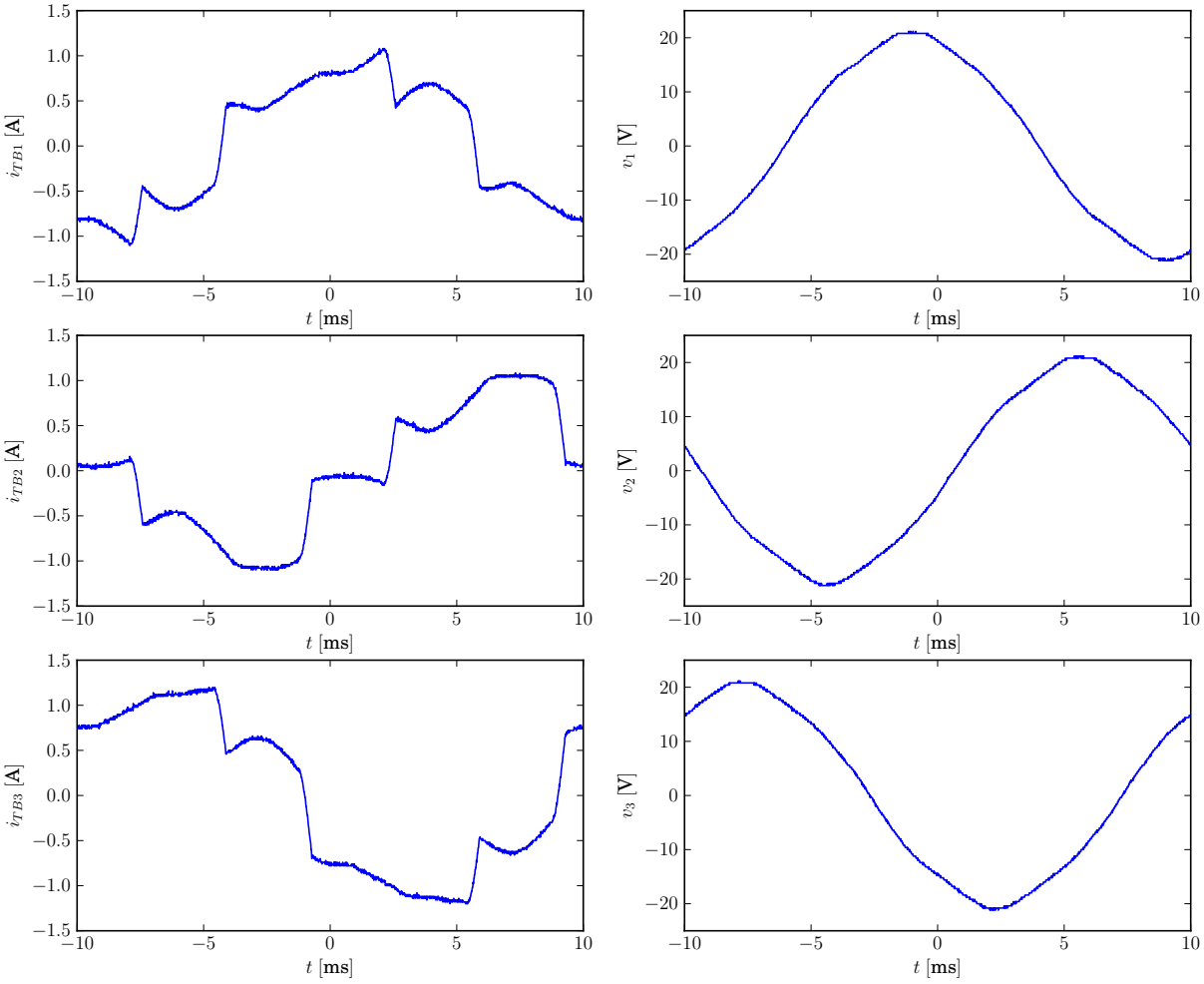
Slika 5: Input spectra, $I_{OUT} = 0.7\,\mathrm{A}$.



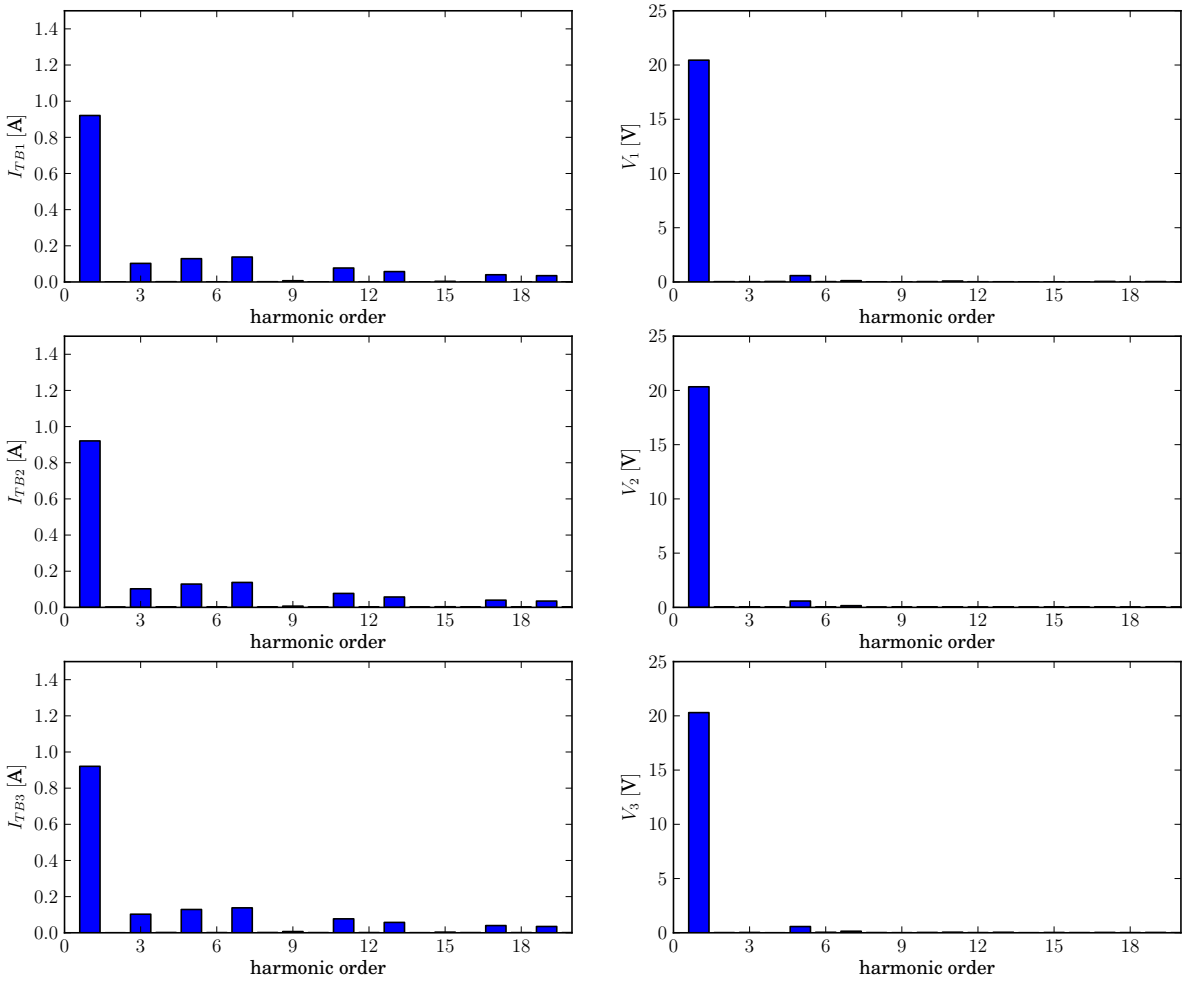
Slika 6: Transformer A waveforms, $I_{OUT} = 0.7\,\mathrm{A}$.



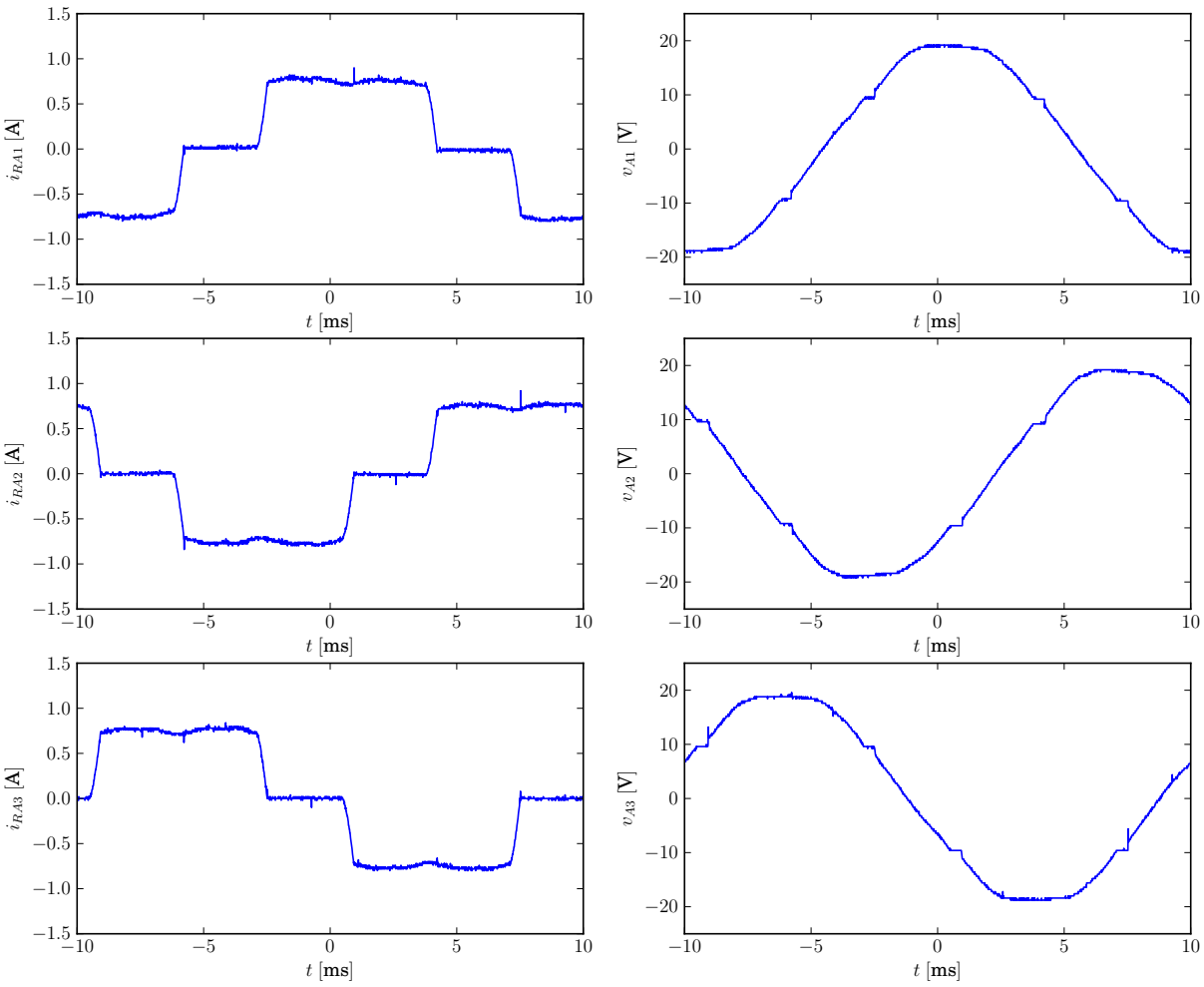
Slika 7: Transformer A spectra, $I_{OUT} = 0.7\,\mathrm{A}$.



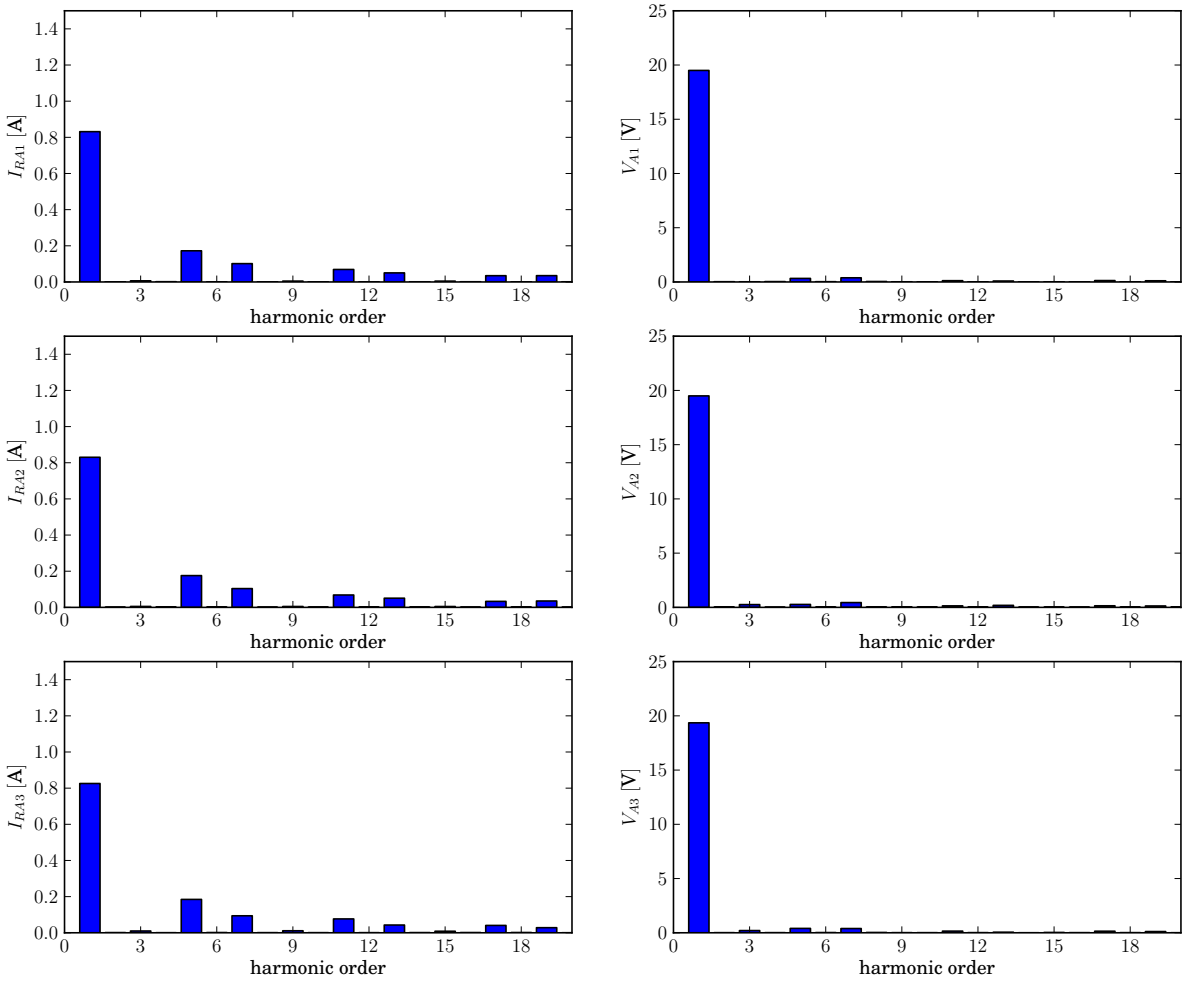
Slika 8: Transformer B waveforms, $I_{OUT} = 0.7\,\mathrm{A}$.



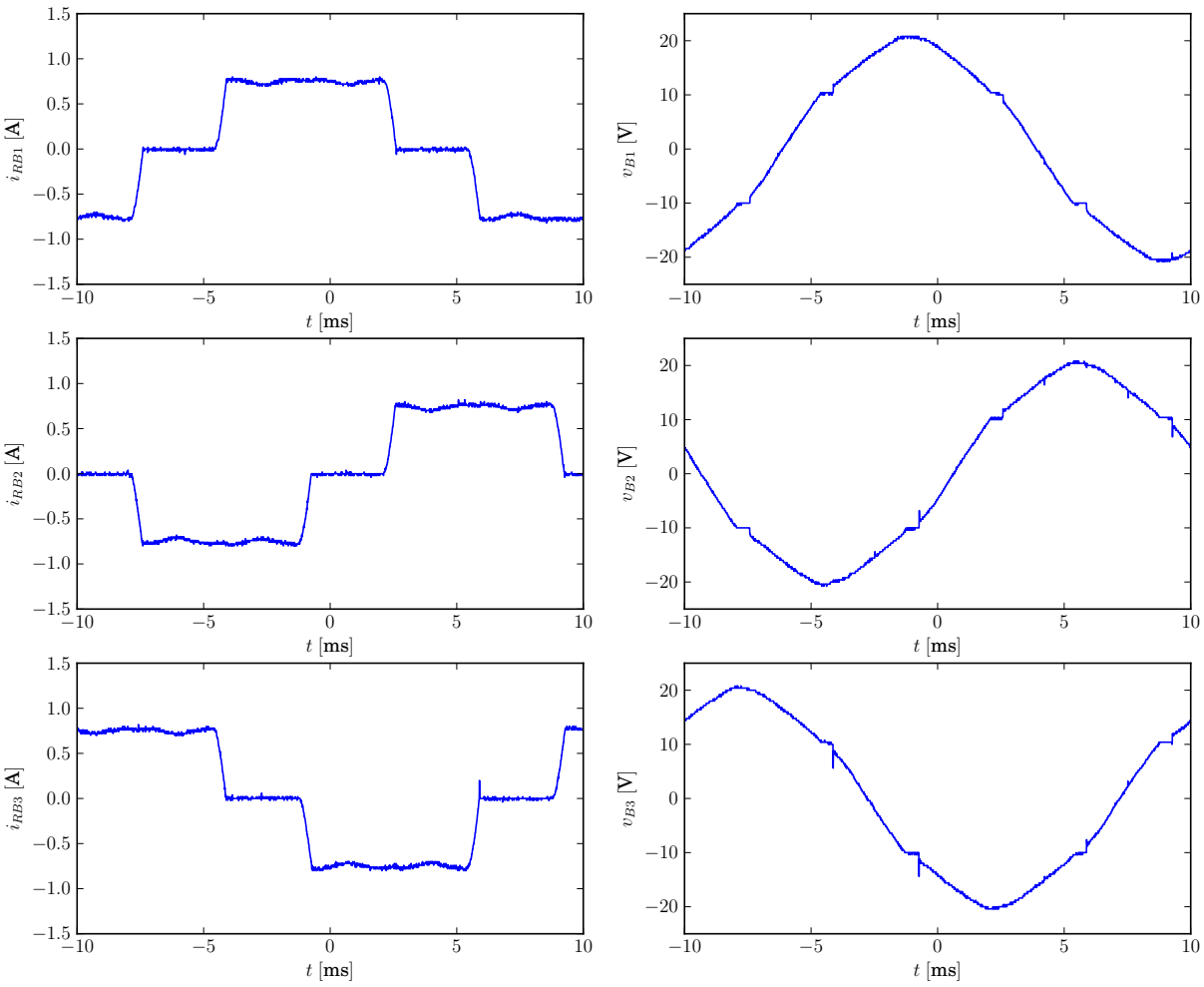
Slika 9: Transformer B spectra, $I_{OUT} = 0.7\,\mathrm{A}$.



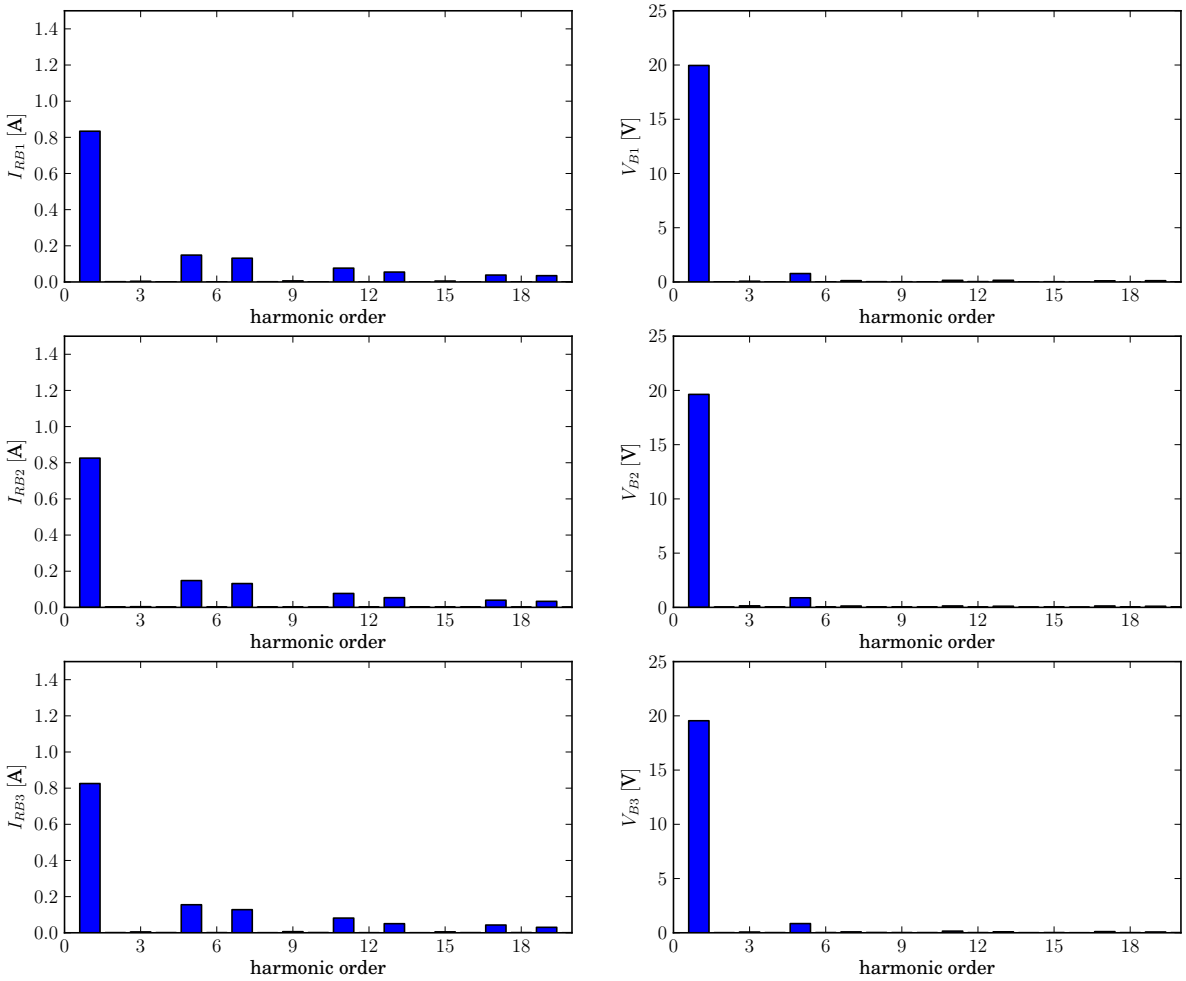
Slika 10: Rectifier A waveforms, $I_{OUT} = 0.7\,\mathrm{A}$.



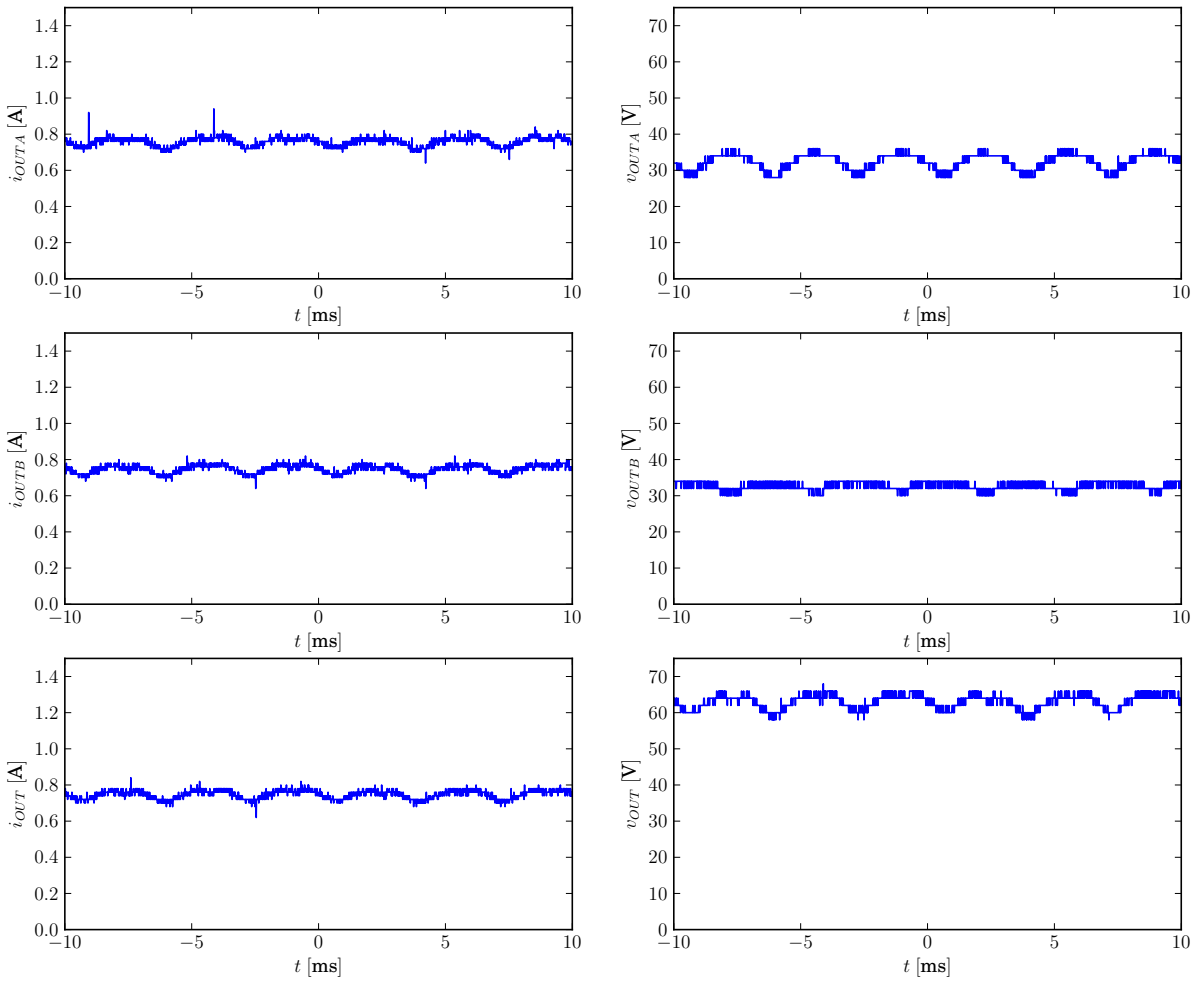
Slika 11: Rectifier A spectra, $I_{OUT} = 0.7\,\mathrm{A}$.



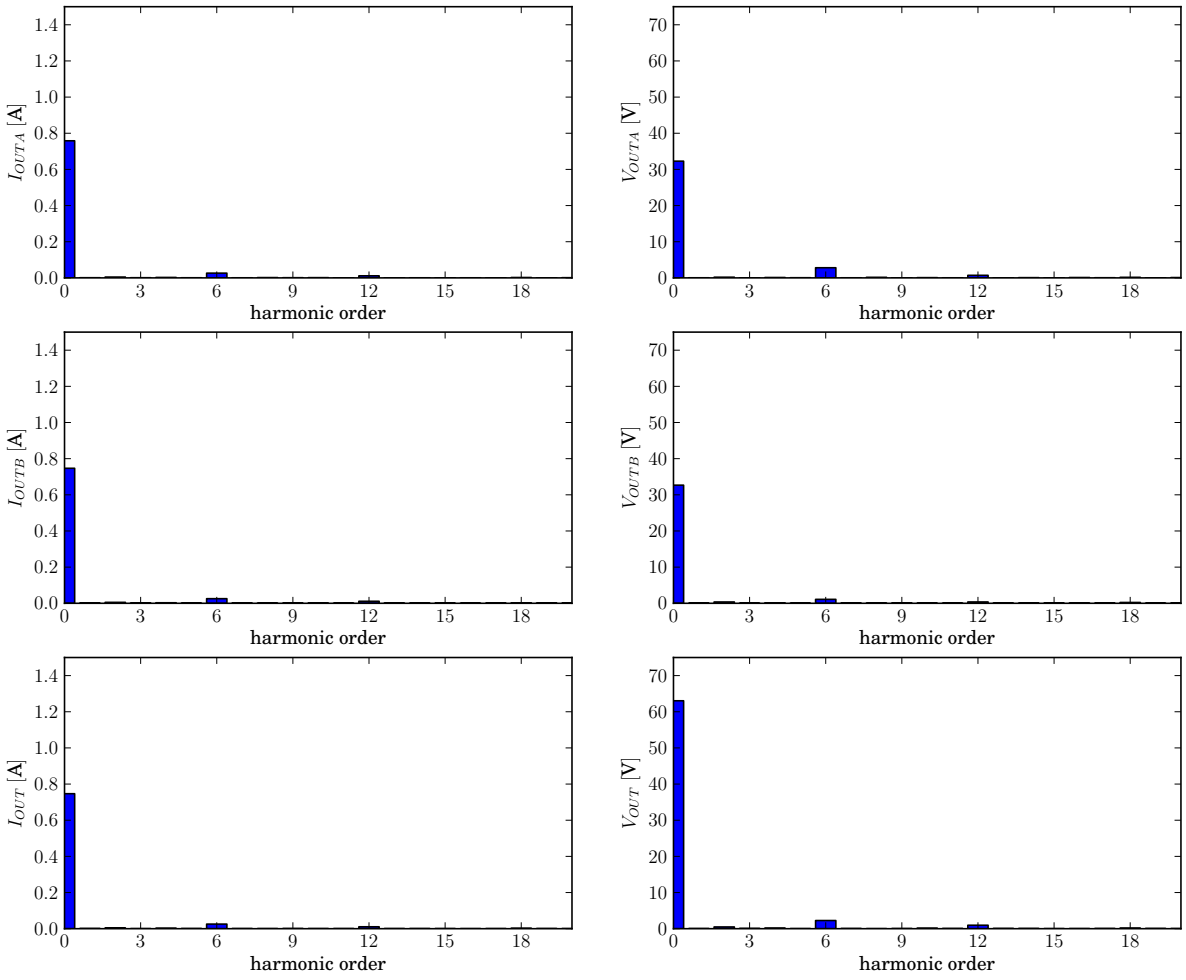
Slika 12: Rectifier B waveforms, $I_{OUT} = 0.7\,\mathrm{A}$.



Slika 13: Rectifier B spectra, $I_{OUT} = 0.7\,\mathrm{A}$.

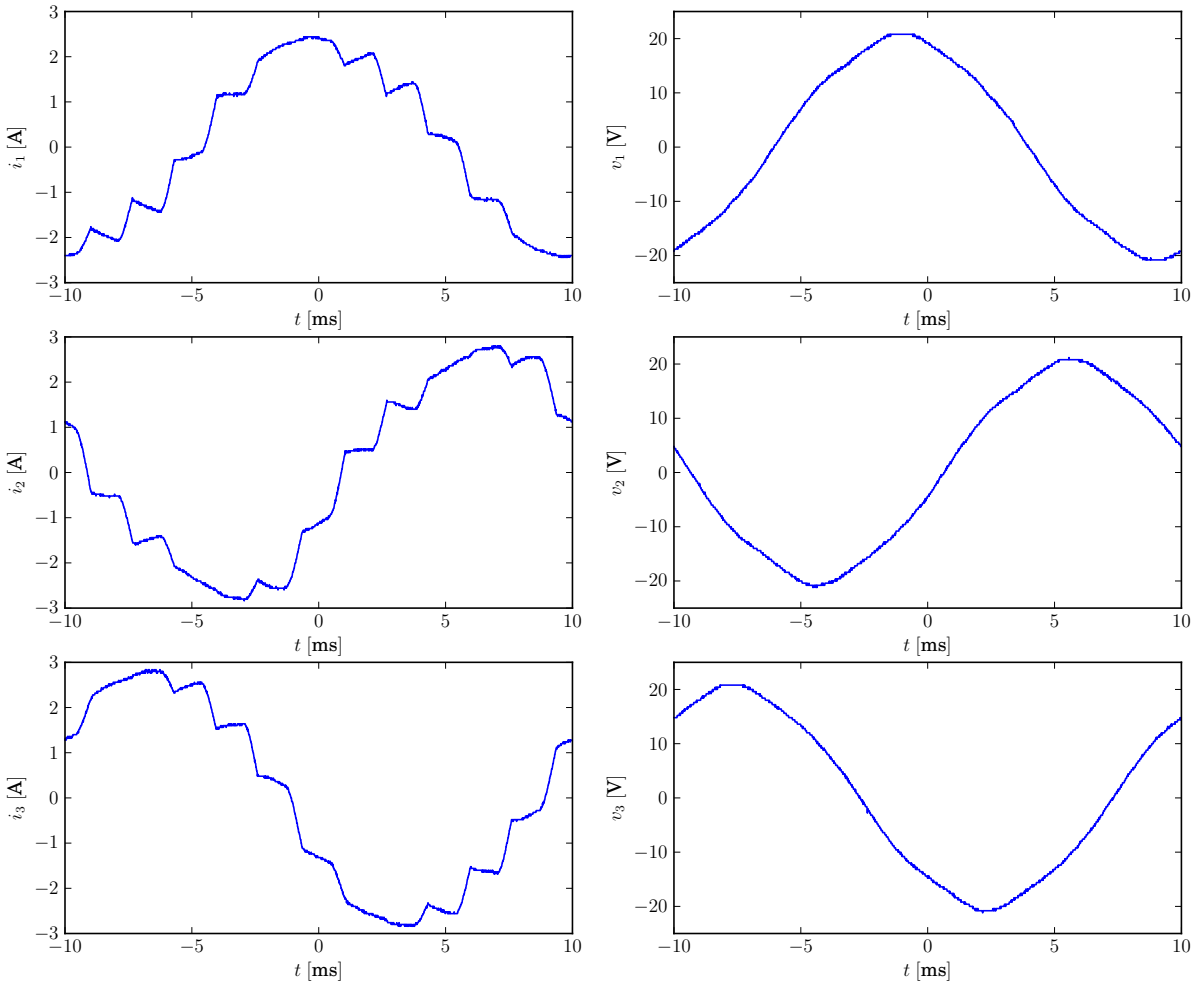


Slika 14: Output waveforms, $I_{OUT} = 0.7\,\mathrm{A}$.



Slika 15: Output spectra, $I_{OUT} = 0.7\,\mathrm{A}$.

3 Analiza za $I_{OUT} = 1\,\mathrm{A}$



Slika 16: Input waveforms, $I_{OUT} = 1\,\mathrm{A}$.

Tabela 10: $I_{OUT} = 1\,\mathrm{A}$, input

phase	1	2	3
$V_{k\,RMS}$ [V]	14.35	14.25	14.27
$THD\,(v_k)$ [%]	3.00	3.42	3.18
$I_{k\,RMS}$ [A]	1.69	1.93	1.99
$THD\,(i_k)$ [%]	12.67	13.56	10.08
P_k [W]	22.66	26.57	26.19
S_k [VA]	24.25	27.50	28.37
PF_k	0.9347	0.9662	0.9231
DPF_k	0.9420	0.9748	0.9283

Tabela 11: $I_{OUT} = 1\,\mathrm{A}$, transformer A

phase	1	2	3
$V_{k\,RMS}$ [V]	14.35	14.22	14.26
$THD\,(v_k)$ [%]	3.04	3.29	3.12
$I_{TA\,k\,RMS}$ [A]	0.84	1.07	0.97
$THD\,(i_{TA\,k})$ [%]	27.81	25.93	22.91
$P_{TA\,k}$ [W]	11.30	14.30	12.14
$S_{TA\,k}$ [VA]	12.09	15.17	13.83
$PF_{TA\,k}$	0.9344	0.9428	0.8782
$DPF_{TA\,k}$	0.9661	0.9703	0.8974

Tabela 12: $I_{OUT} = 1\,\mathrm{A}$, transformer B

phase	1	2	3
$V_{k\,RMS}$ [V]	14.39	14.24	14.20
$THD\,(v_k)$ [%]	2.97	3.26	3.72
$I_{TB\,k\,RMS}$ [A]	0.89	0.91	1.06
$THD\,(i_{TB\,k})$ [%]	25.77	28.81	23.16
$P_{TB\,k}$ [W]	11.21	12.21	13.79
$S_{TB\,k}$ [VA]	12.78	13.02	15.01
$PF_{TB\,k}$	0.8767	0.9374	0.9187
$DPF_{TB\,k}$	0.9084	0.9801	0.9482

Tabela 13: $I_{OUT} = 1\,\mathrm{A}$, rectifier A

phase	1	2	3
$V_{Ak\,RMS}$ [V]	13.18	13.18	13.10
$THD\,(v_{Ak})$ [%]	3.73	4.60	4.13
$I_{RAk\,RMS}$ [A]	0.85	0.85	0.84
$THD\,(i_{RAk})$ [%]	26.96	26.84	27.54
P_{RAk} [W]	10.75	10.73	10.58
S_{RAk} [VA]	11.18	11.17	11.04
PF_{RAk}	0.9618	0.9605	0.9584
DPF_{RAk}	0.9992	0.9989	0.9986

Tabela 14: $I_{OUT} = 1\,\mathrm{A}$, rectifier B

phase	1	2	3
$V_{Bk\,RMS}$ [V]	13.42	13.22	13.19
$THD\,(v_{Bk})$ [%]	5.41	5.65	5.65
$I_{RBk\,RMS}$ [A]	0.85	0.84	0.84
$THD\,(i_{RBk})$ [%]	26.63	26.74	27.03
P_{RBk} [W]	10.87	10.62	10.59
S_{RBk} [VA]	11.40	11.15	11.14
PF_{RBk}	0.9531	0.9521	0.9512
DPF_{RBk}	0.9990	0.9990	0.9988

Tabela 15: $I_{OUT} = 1\,\mathrm{A}$, output

output	rectifier A	rectifier B	complete output
I_{OUT} [A]	1.07	1.07	1.07
V_{OUT} [V]	28.89	29.19	58.19
P_{OUT} [W]	30.90	31.21	62.11

Snage:

1. $P_{IN} = 75.43\,\mathrm{W}$
2. $P_{TA} = 37.74\,\mathrm{W}$
3. $P_{TB} = 37.20\,\mathrm{W}$
4. $P_{RA} = 32.07\,\mathrm{W}$
5. $P_{RB} = 32.08\,\mathrm{W}$
6. $P_{OUTA} = 30.90\,\mathrm{W}$
7. $P_{OUTB} = 31.21\,\mathrm{W}$
8. $P_{OUT} = 62.11\,\mathrm{W}$

Gubici:

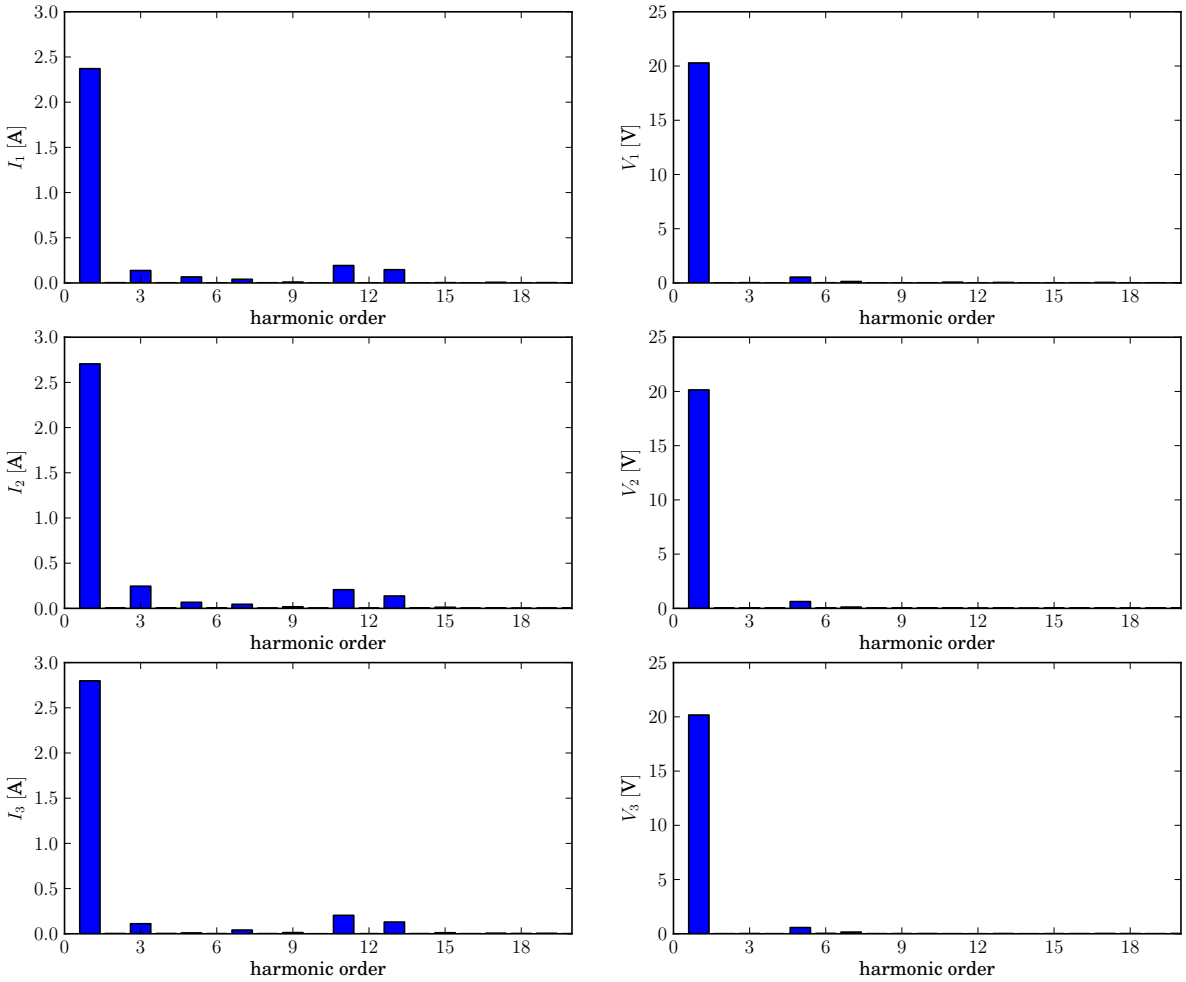
1. $P_{loss\,TA} = 5.67\,\mathrm{W}$
2. $P_{loss\,TB} = 5.12\,\mathrm{W}$
3. $P_{loss\,RA} = 1.17\,\mathrm{W}$
4. $P_{loss\,RB} = 0.87\,\mathrm{W}$
5. $P_{loss} = P_{IN} - P_{OUT} = 13.32\,\mathrm{W}$

Koeficijenti korisnog dejstva:

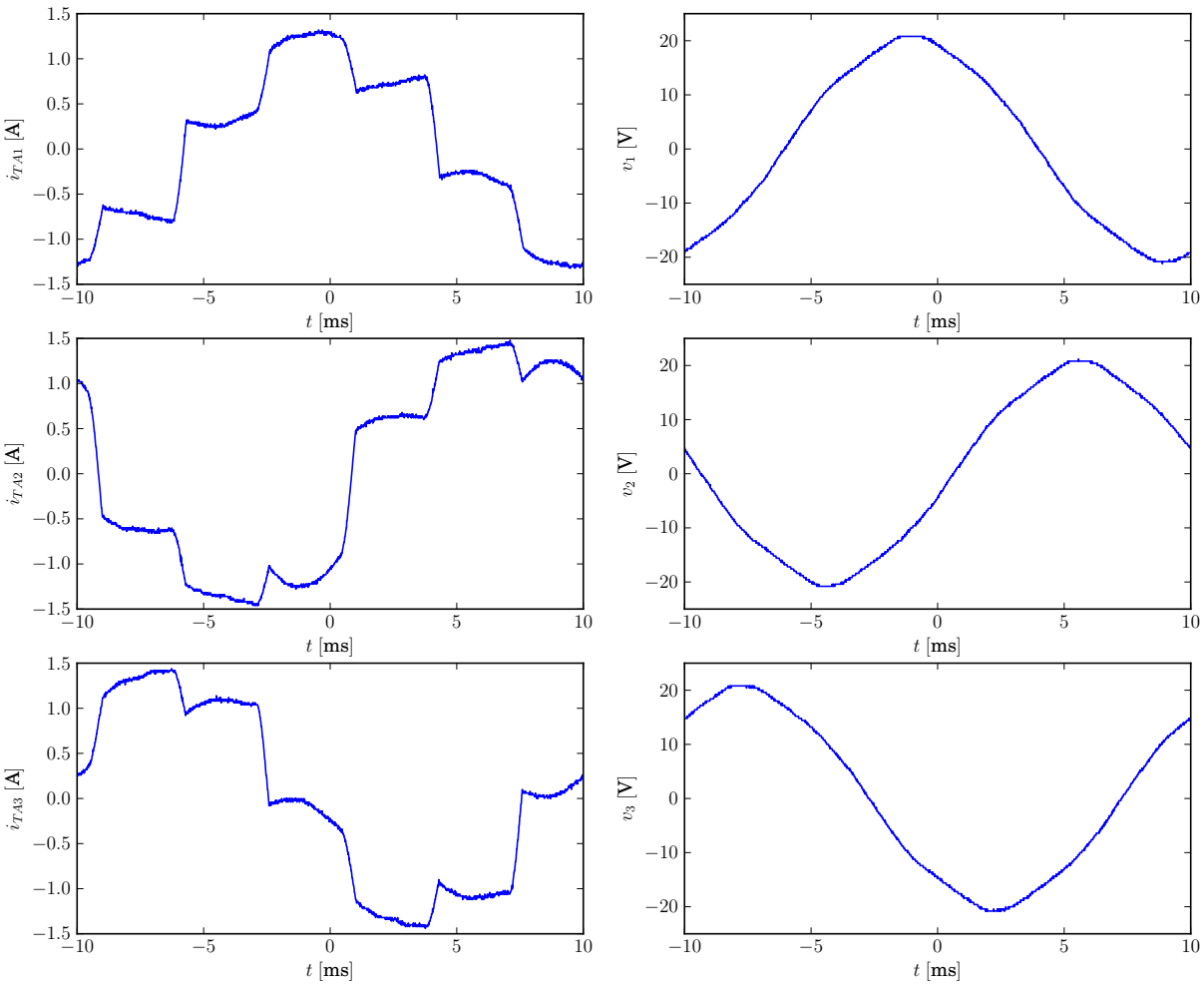
1. $\eta_{TA} = 84.96\%$
2. $\eta_{TB} = 86.23\%$
3. $\eta_{RA} = 96.35\%$
4. $\eta_{RB} = 97.29\%$
5. $\eta = 82.34\%$

Nekonzistentnosti u snagama:

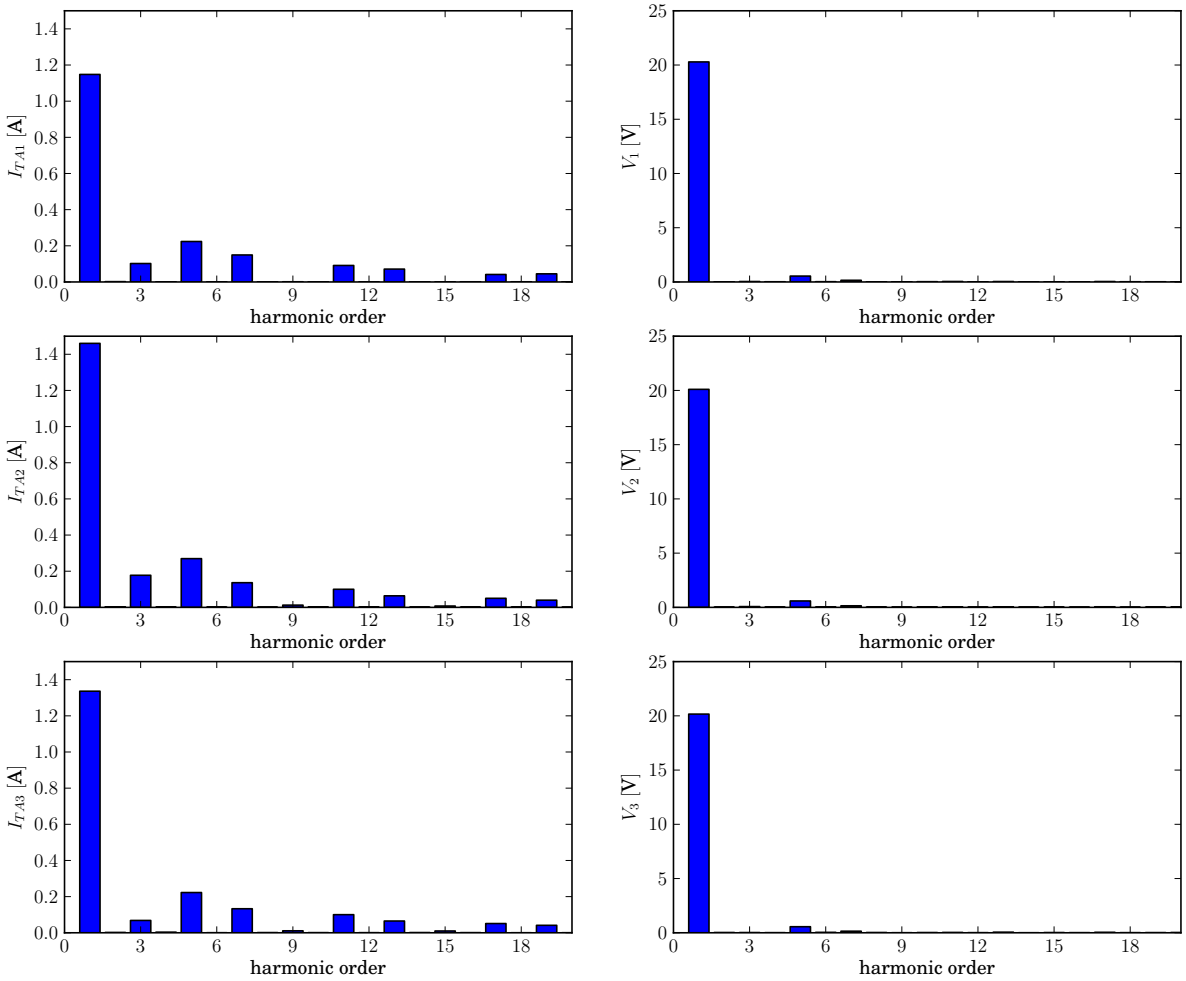
1. $\Delta P_{IN} = P_{IN} - P_{TA} - P_{TB} = 0.49\,\mathrm{W}$
2. $\Delta P_{OUT} = P_{OUT} - P_{OUTA} - P_{OUTB} = 0.00\,\mathrm{W}$
3. $\Delta P_{loss} = P_{IN} - P_{OUT} - \Sigma P_{loss} = 0.49\,\mathrm{W}$



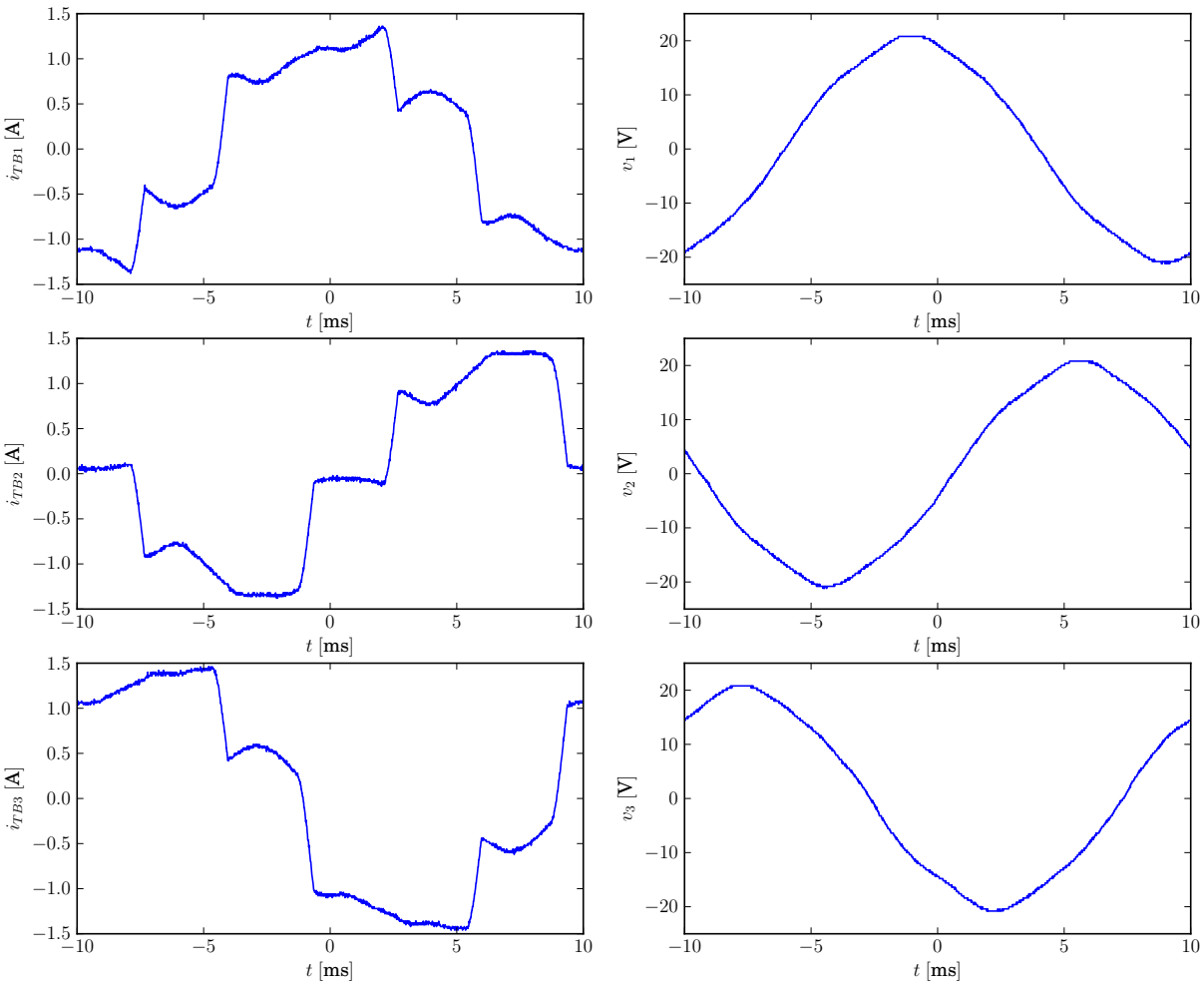
Slika 17: Input spectra, $I_{OUT} = 1\,\mathrm{A}$.



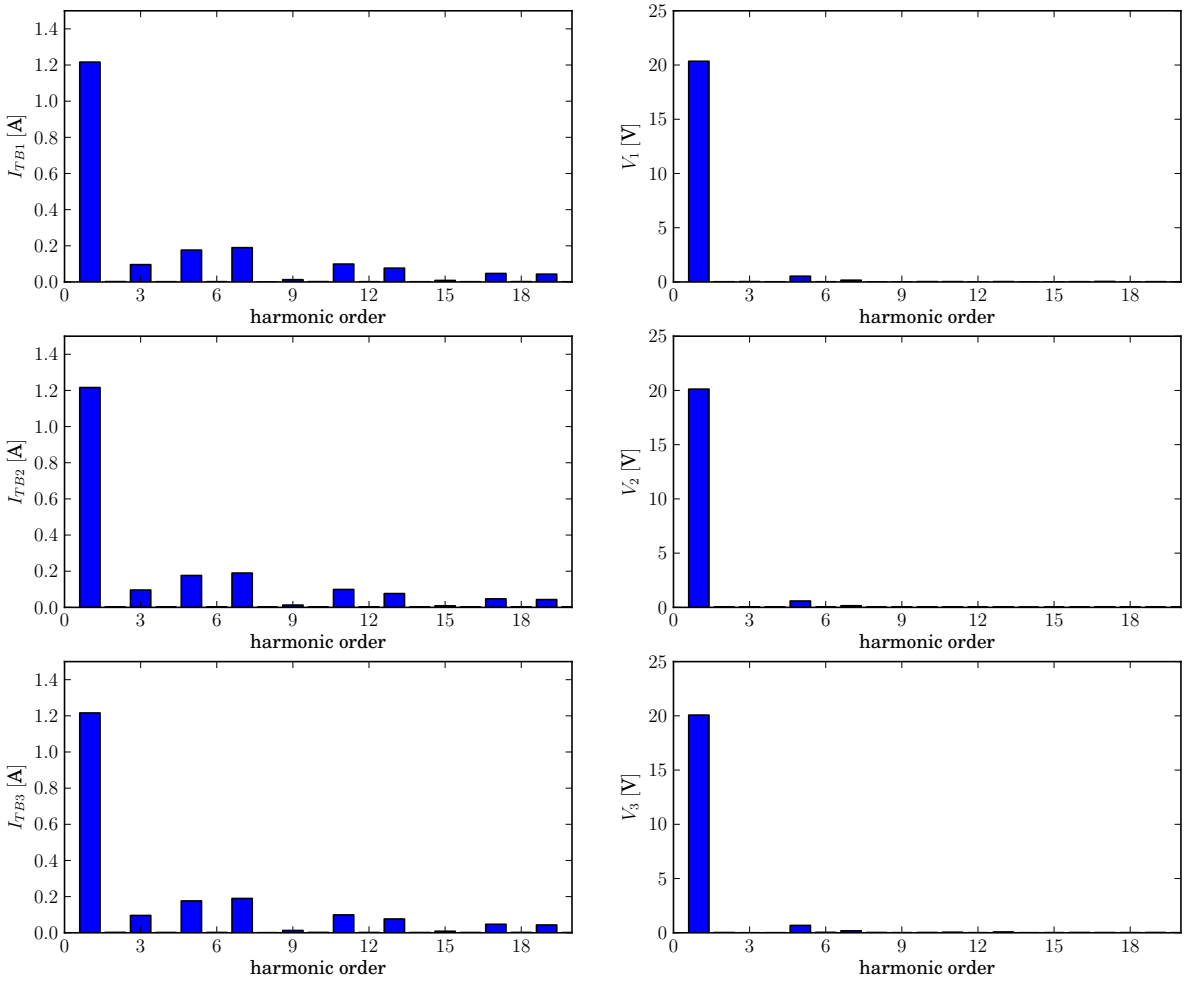
Slika 18: Transformer A waveforms, $I_{OUT} = 1\,\mathrm{A}$.



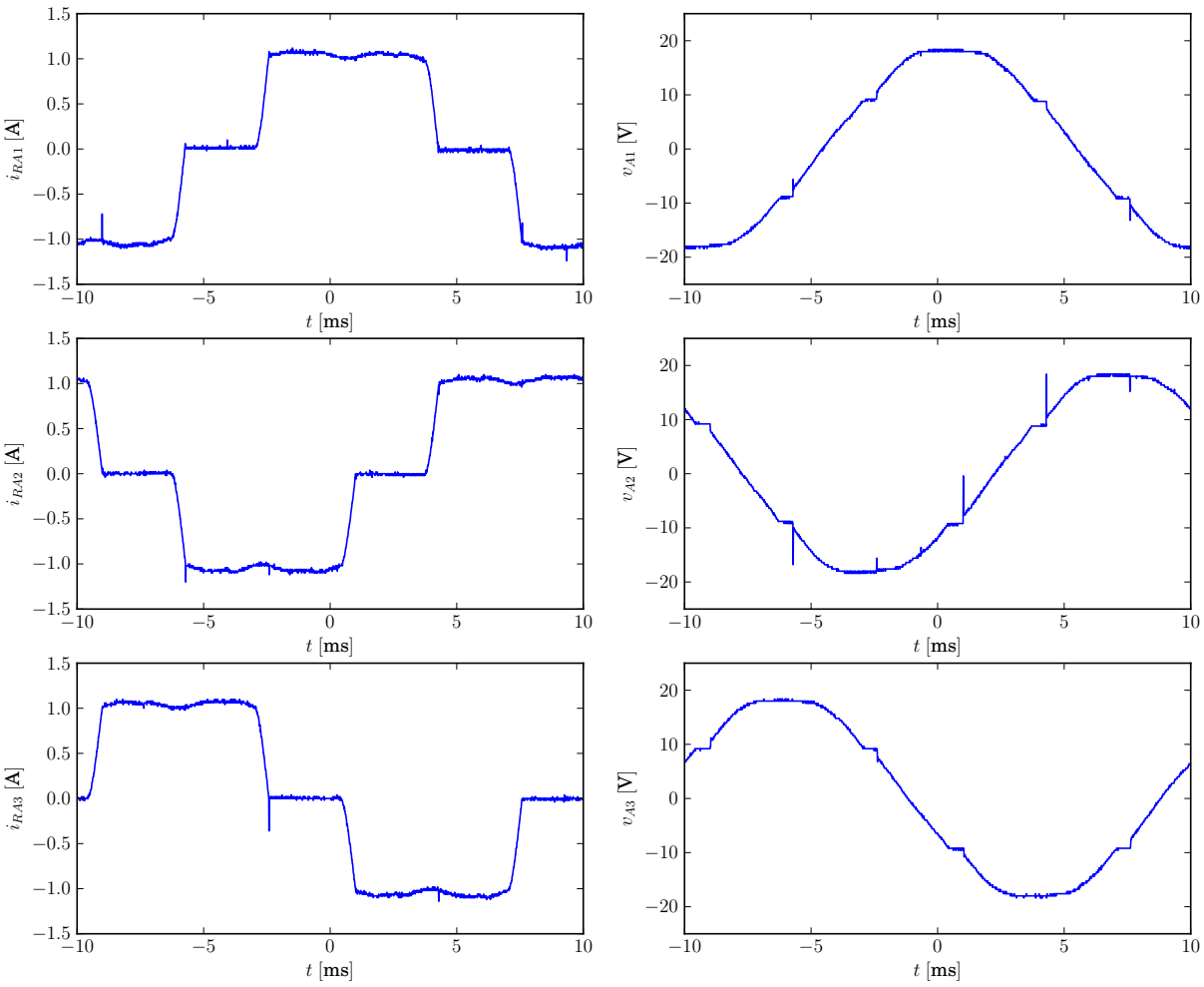
Slika 19: Transformer A spectra, $I_{OUT} = 1\,\mathrm{A}$.



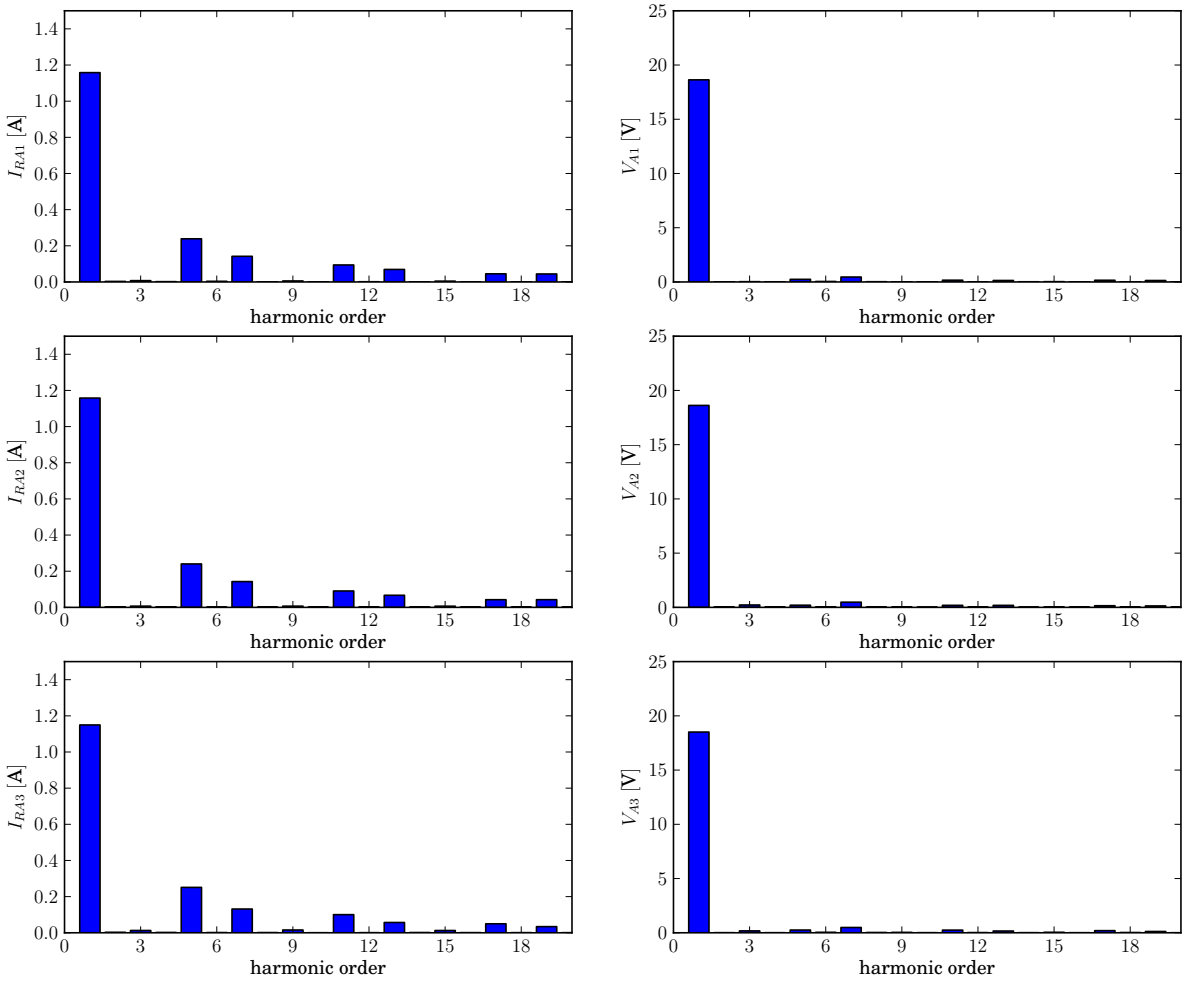
Slika 20: Transformer B waveforms, $I_{OUT} = 1\,\mathrm{A}$.



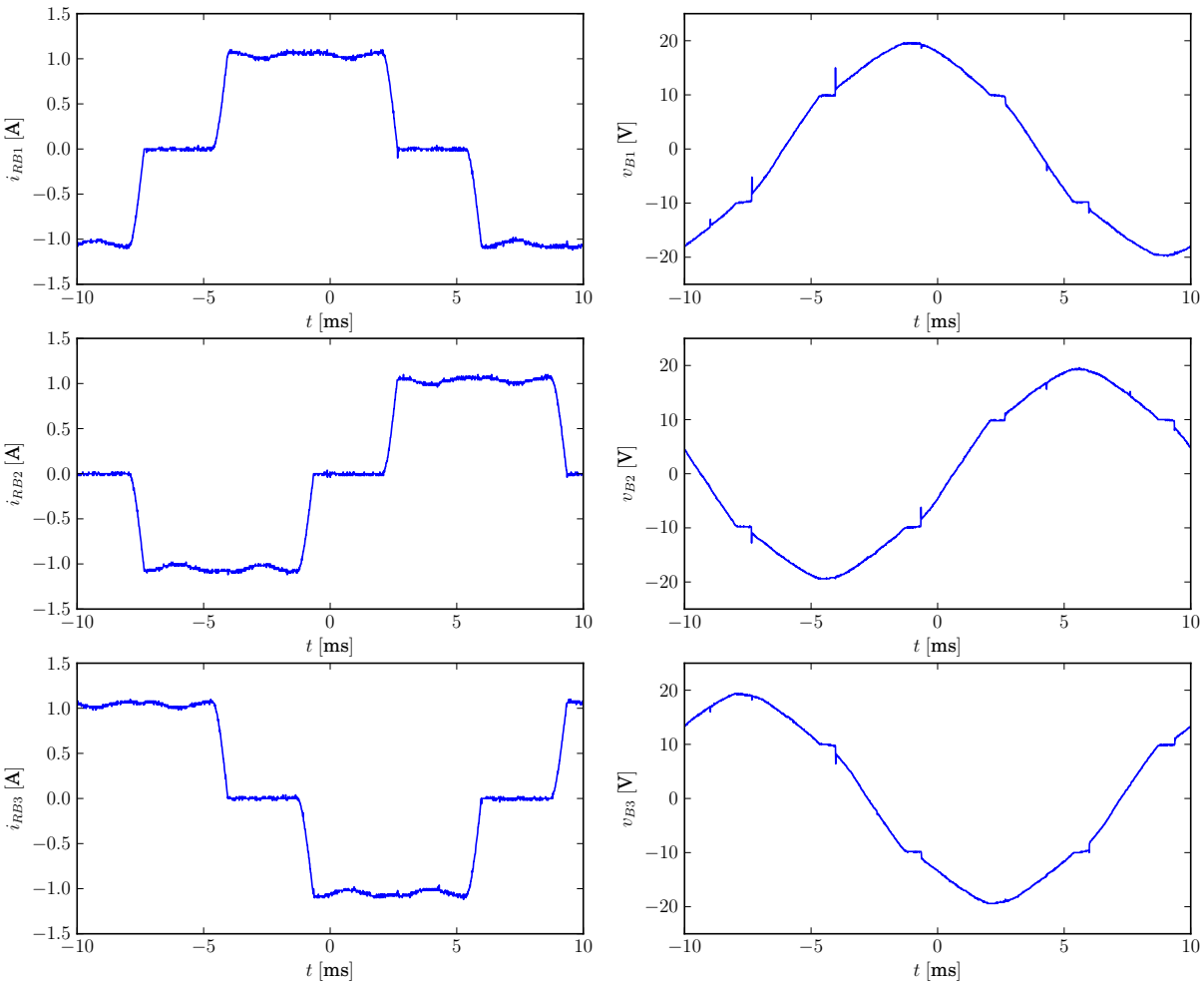
Slika 21: Transformer B spectra, $I_{OUT} = 1\,\mathrm{A}$.



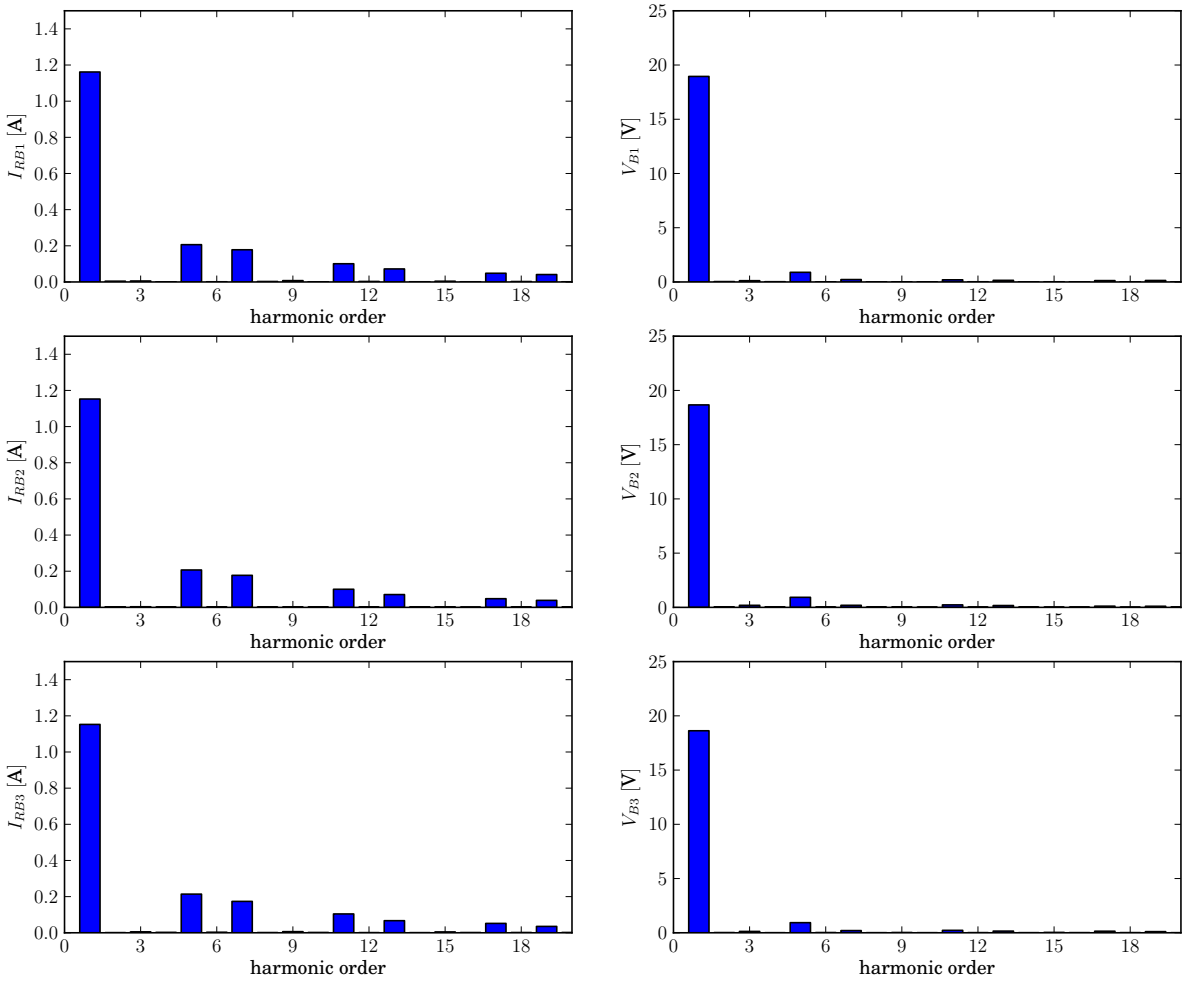
Slika 22: Rectifier A waveforms, $I_{OUT} = 1\,\mathrm{A}$.



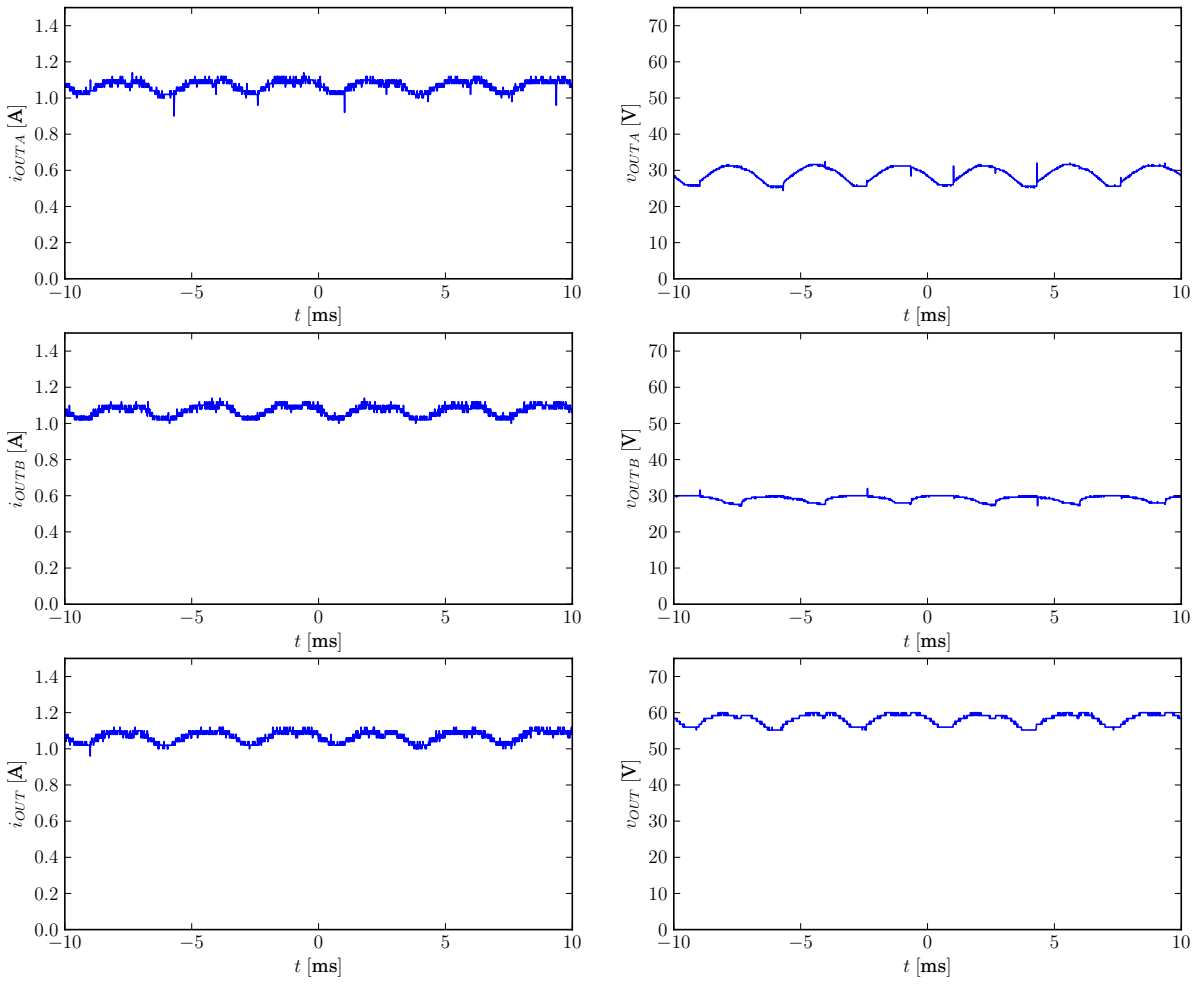
Slika 23: Rectifier A spectra, $I_{OUT} = 1\,\mathrm{A}$.



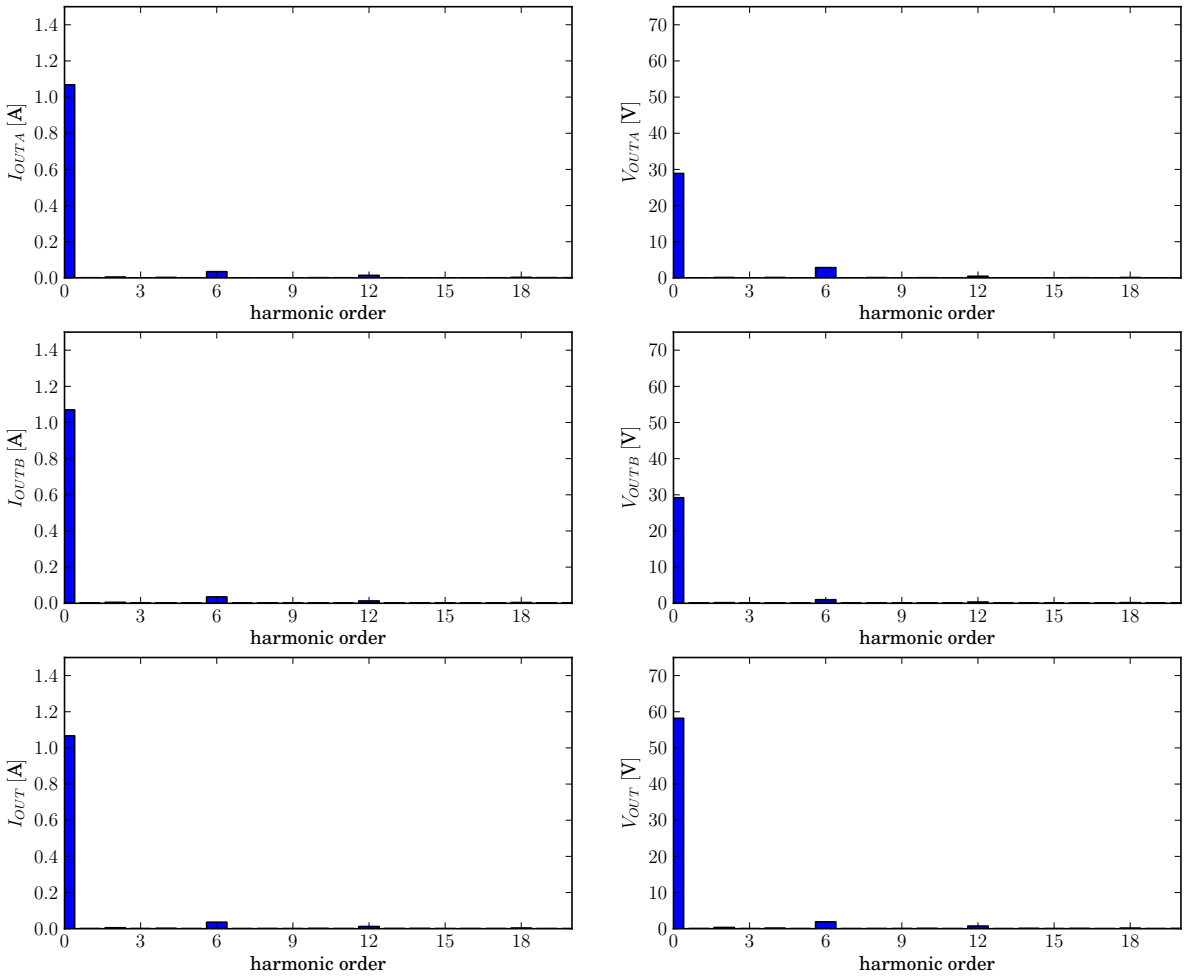
Slika 24: Rectifier B waveforms, $I_{OUT} = 1\,\mathrm{A}$.



Slika 25: Rectifier B spectra, $I_{OUT} = 1\,\mathrm{A}$.

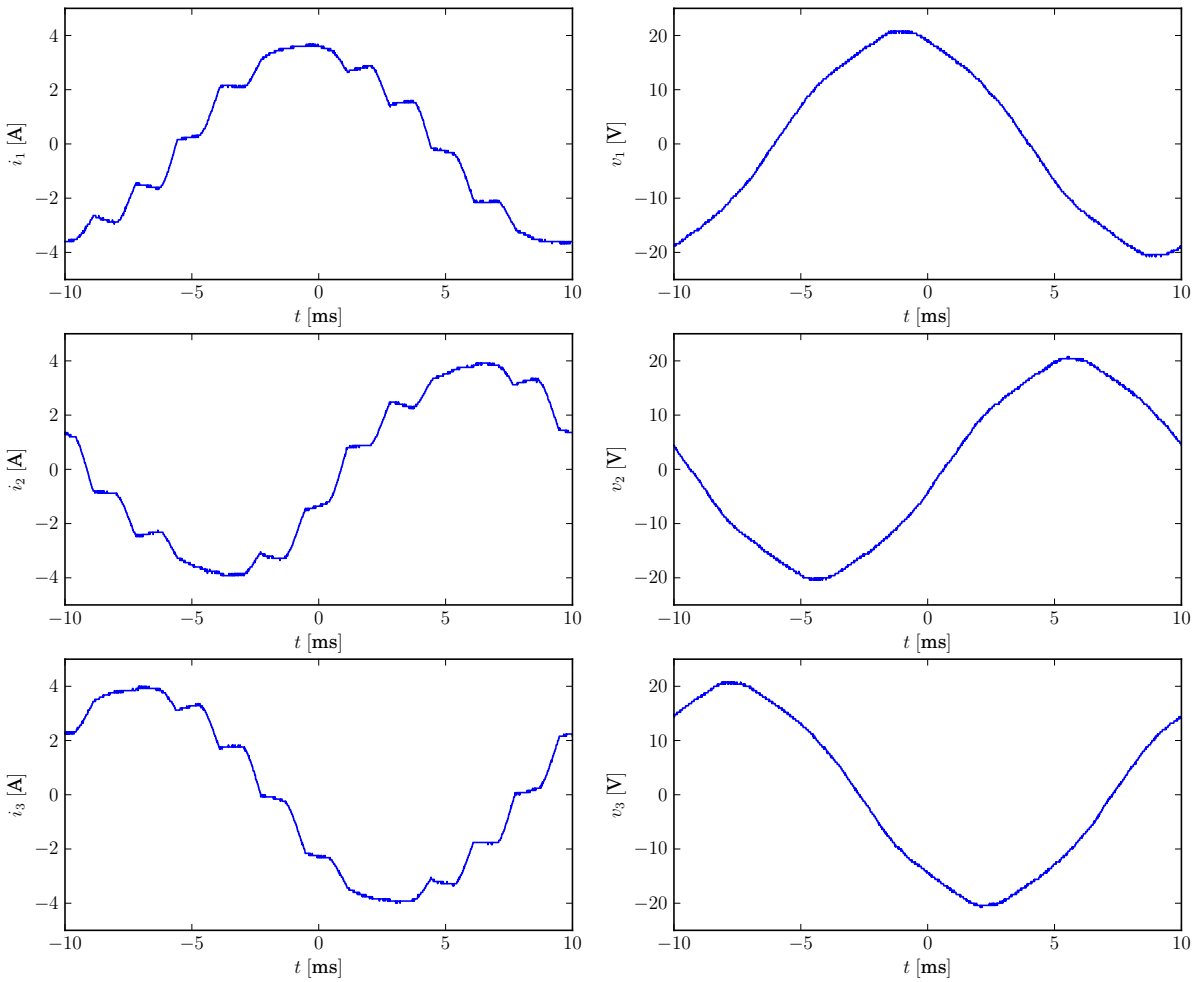


Slika 26: Output waveforms, $I_{OUT} = 1\,\mathrm{A}$.



Slika 27: Output spectra, $I_{OUT} = 1\,\mathrm{A}$.

4 Analiza za $I_{OUT} = 1.5\,\mathrm{A}$



Slika 28: Input waveforms, $I_{OUT} = 1.5\,\mathrm{A}$.

Tabela 16: $I_{OUT} = 1.5\,\mathrm{A}$, input

phase	1	2	3
$V_{k\,RMS}$ [V]	14.19	13.92	14.07
$THD\,(v_k)$ [%]	3.08	3.25	3.17
$I_{k\,RMS}$ [A]	2.53	2.73	2.77
$THD\,(i_k)$ [%]	10.18	10.51	8.83
P_k [W]	34.94	37.40	37.66
S_k [VA]	35.96	38.03	39.05
PF_k	0.9717	0.9836	0.9643
DPF_k	0.9768	0.9892	0.9686

Tabela 17: $I_{OUT} = 1.5\,\mathrm{A}$, transformer A

phase	1	2	3
$V_{k\,RMS}$ [V]	14.15	14.03	14.06
$THD\,(v_k)$ [%]	3.37	3.60	3.13
$I_{TA\,k\,RMS}$ [A]	1.28	1.46	1.37
$THD\,(i_{TA\,k})$ [%]	25.46	24.15	23.33
$P_{TA\,k}$ [W]	17.41	19.77	18.05
$S_{TA\,k}$ [VA]	18.13	20.55	19.21
$PF_{TA\,k}$	0.9601	0.9624	0.9397
$DPF_{TA\,k}$	0.9855	0.9850	0.9609

Tabela 18: $I_{OUT} = 1.5\,\mathrm{A}$, transformer B

phase	1	2	3
$V_{k\,RMS}$ [V]	14.20	14.05	14.07
$THD\,(v_k)$ [%]	3.07	3.17	3.07
$I_{TB\,k\,RMS}$ [A]	1.30	1.34	1.45
$THD\,(i_{TB\,k})$ [%]	24.08	25.39	22.80
$P_{TB\,k}$ [W]	17.27	18.02	19.35
$S_{TB\,k}$ [VA]	18.47	18.85	20.41
$PF_{TB\,k}$	0.9350	0.9562	0.9480
$DPF_{TB\,k}$	0.9655	0.9907	0.9764

Tabela 19: $I_{OUT} = 1.5\,\mathrm{A}$, rectifier A

phase	1	2	3
$V_{A\,k\,RMS}$ [V]	12.10	12.08	12.03
$THD\,(v_{A\,k})$ [%]	5.05	5.21	5.23
$I_{RA\,k\,RMS}$ [A]	1.26	1.26	1.26
$THD\,(i_{RA\,k})$ [%]	25.21	25.44	25.82
$P_{RA\,k}$ [W]	14.66	14.64	14.47
$S_{RA\,k}$ [VA]	15.26	15.27	15.11
$PF_{RA\,k}$	0.9601	0.9589	0.9580
$DPF_{RA\,k}$	0.9984	0.9981	0.9981

Tabela 20: $I_{OUT} = 1.5\,\mathrm{A}$, rectifier B

phase	1	2	3
$V_{B\,k\,RMS}$ [V]	12.50	12.33	12.31
$THD\,(v_{B\,k})$ [%]	7.41	7.86	7.34
$I_{RB\,k\,RMS}$ [A]	1.26	1.25	1.25
$THD\,(i_{RB\,k})$ [%]	24.85	24.78	25.37
$P_{RB\,k}$ [W]	14.96	14.66	14.63
$S_{RB\,k}$ [VA]	15.72	15.42	15.39
$PF_{RB\,k}$	0.9516	0.9504	0.9504
$DPF_{RB\,k}$	0.9983	0.9983	0.9982

Tabela 21: $I_{OUT} = 1.5\,\mathrm{A}$, output

output	rectifier A	rectifier B	complete output
I_{OUT} [A]	1.59	1.59	1.59
V_{OUT} [V]	26.37	26.83	53.34
P_{OUT} [W]	41.92	42.53	84.65

Snage:

1. $P_{IN} = 110.00\,\mathrm{W}$
2. $P_{TA} = 55.24\,\mathrm{W}$
3. $P_{TB} = 54.64\,\mathrm{W}$
4. $P_{RA} = 43.78\,\mathrm{W}$
5. $P_{RB} = 44.24\,\mathrm{W}$
6. $P_{OUTA} = 41.92\,\mathrm{W}$
7. $P_{OUTB} = 42.53\,\mathrm{W}$
8. $P_{OUT} = 84.65\,\mathrm{W}$

Gubici:

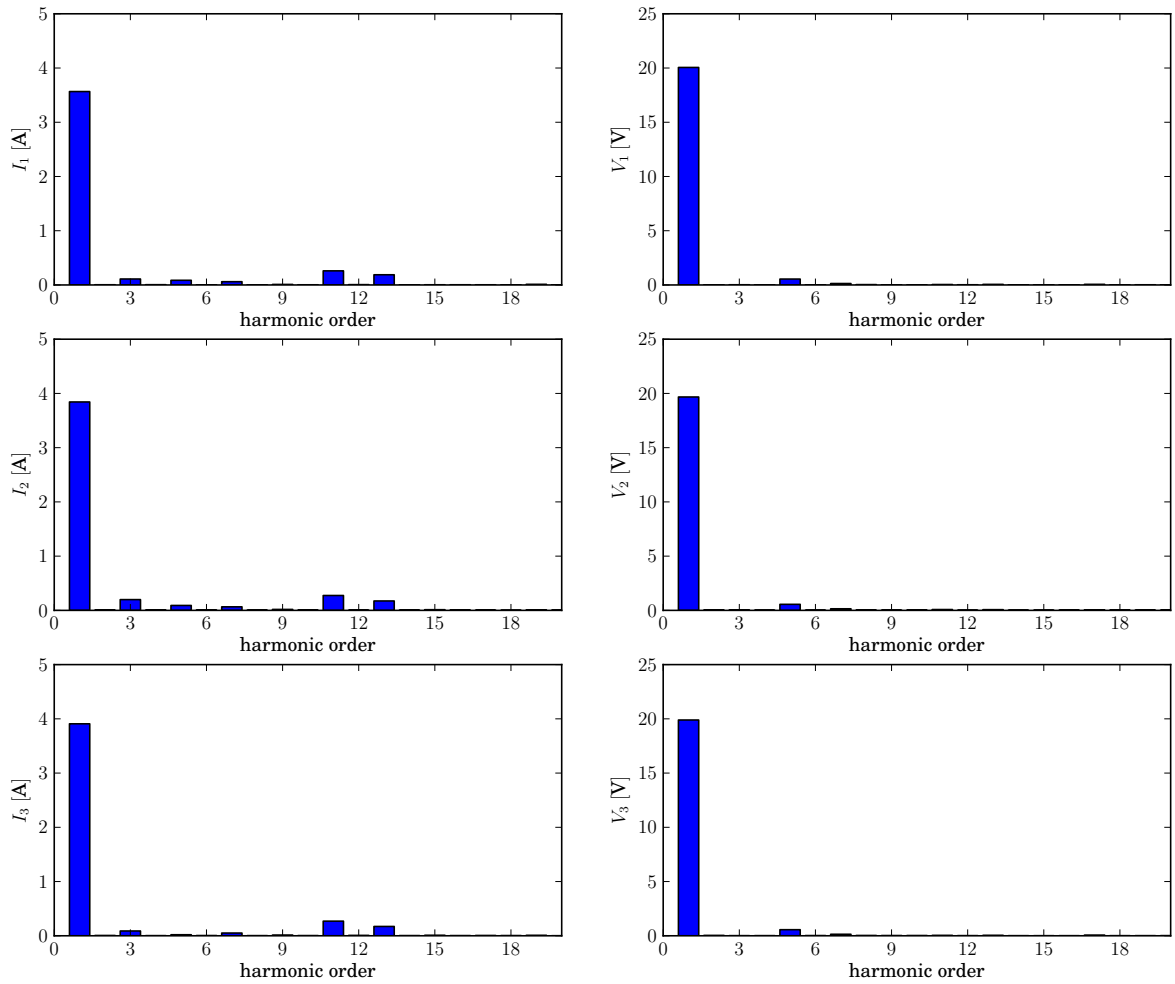
1. $P_{loss\,TA} = 11.46\,\mathrm{W}$
2. $P_{loss\,TB} = 10.40\,\mathrm{W}$
3. $P_{loss\,RA} = 1.86\,\mathrm{W}$
4. $P_{loss\,RB} = 1.71\,\mathrm{W}$
5. $P_{loss} = P_{IN} - P_{OUT} = 25.35\,\mathrm{W}$

Koeficijenti korisnog dejstva:

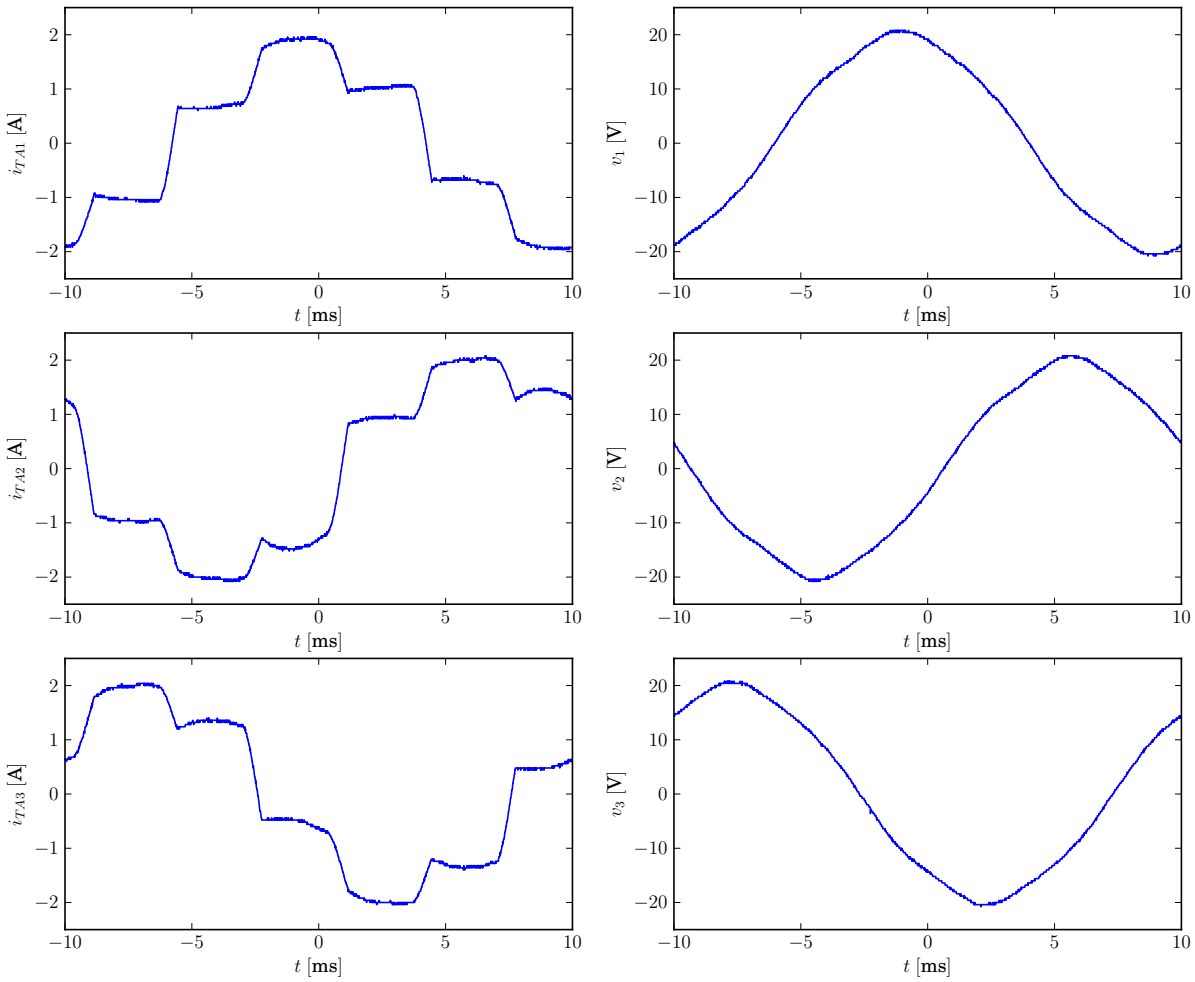
1. $\eta_{TA} = 79.25\%$
2. $\eta_{TB} = 80.97\%$
3. $\eta_{RA} = 95.75\%$
4. $\eta_{RB} = 96.14\%$
5. $\eta = 76.96\%$

Nekonzistentnosti u snagama:

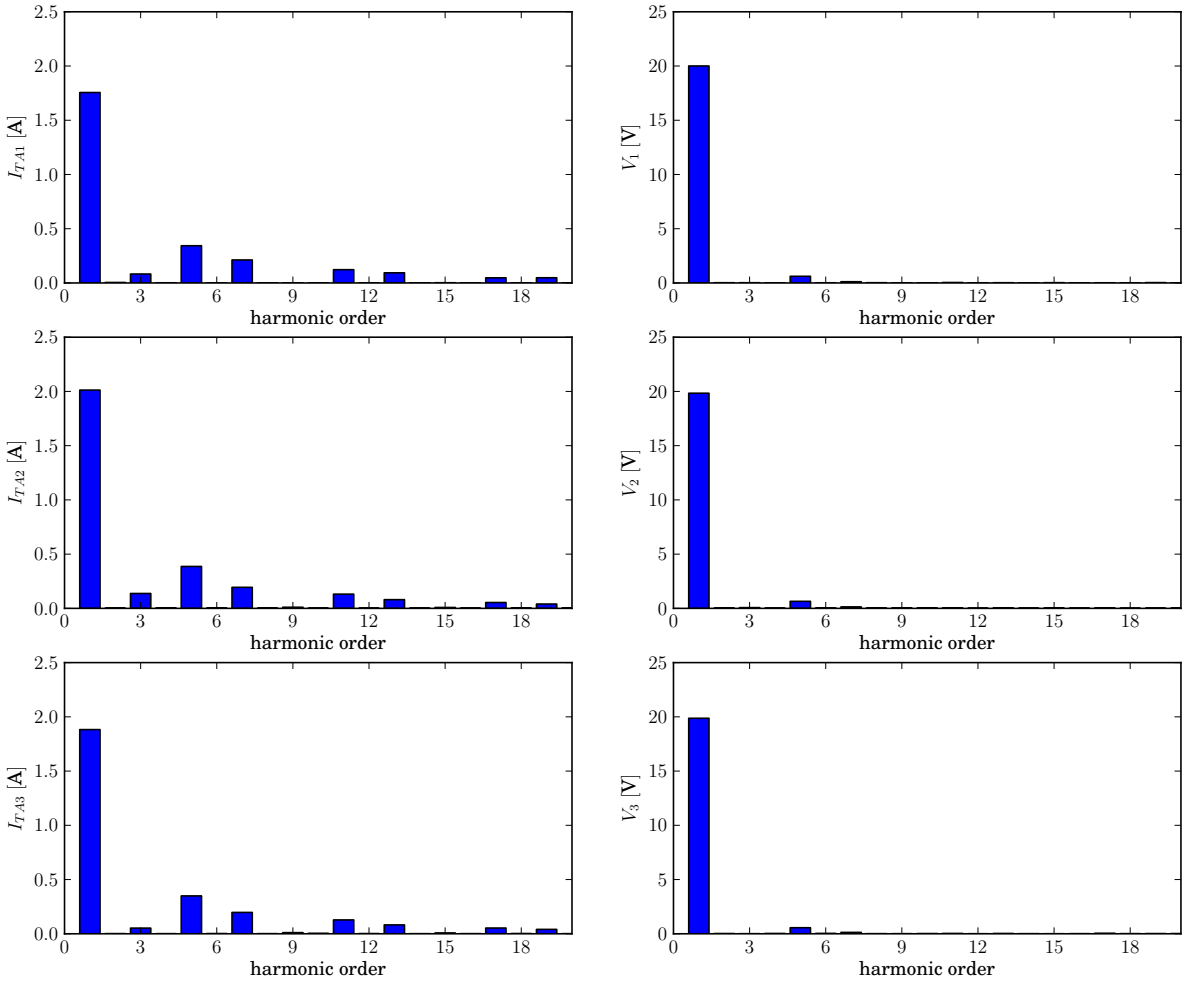
1. $\Delta P_{IN} = P_{IN} - P_{TA} - P_{TB} = 0.12\,\mathrm{W}$
2. $\Delta P_{OUT} = P_{OUT} - P_{OUTA} - P_{OUTB} = 0.20\,\mathrm{W}$
3. $\Delta P_{loss} = P_{IN} - P_{OUT} - \Sigma P_{loss} = -0.08\,\mathrm{W}$



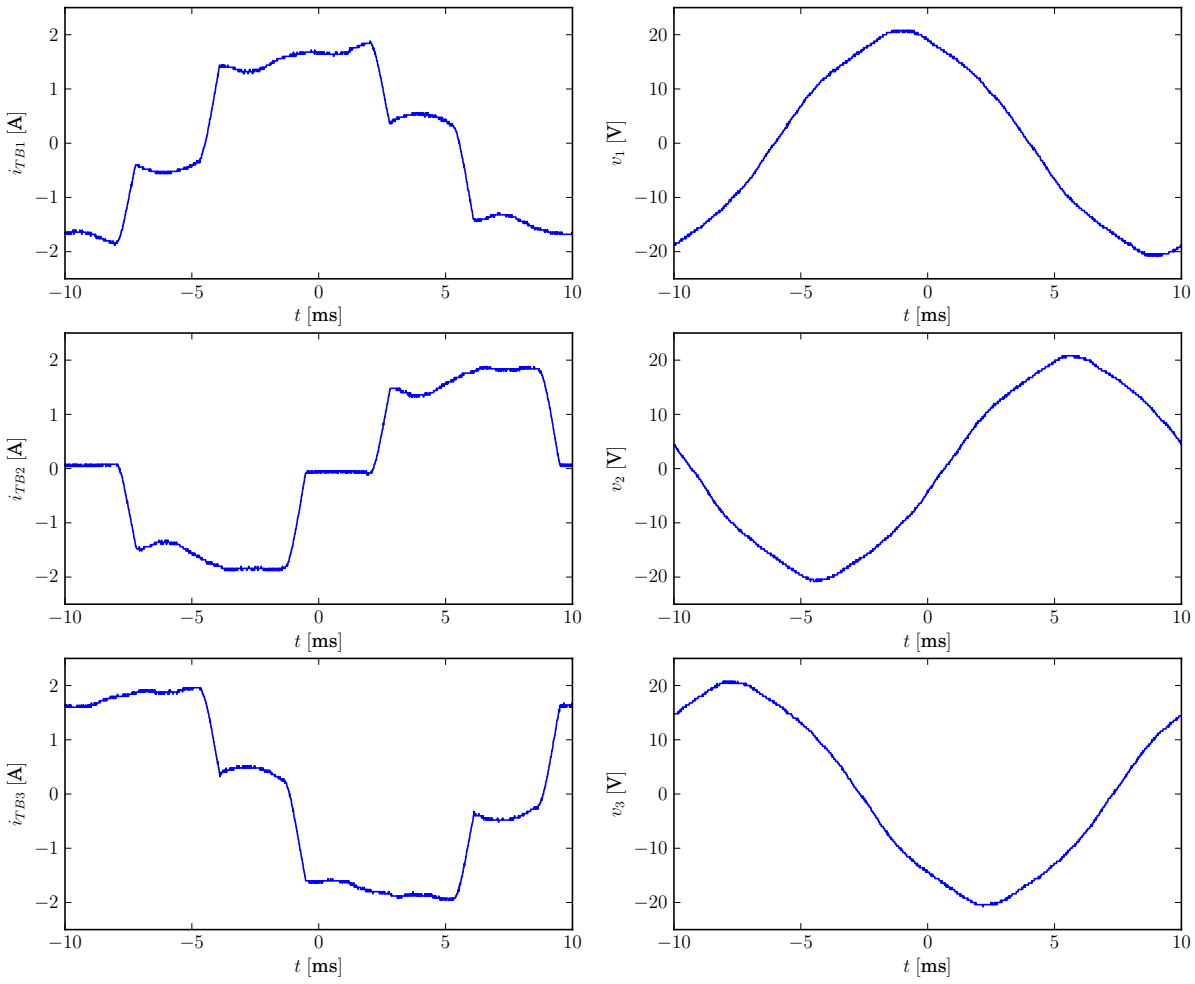
Slika 29: Input spectra, $I_{OUT} = 1.5\,\mathrm{A}$.



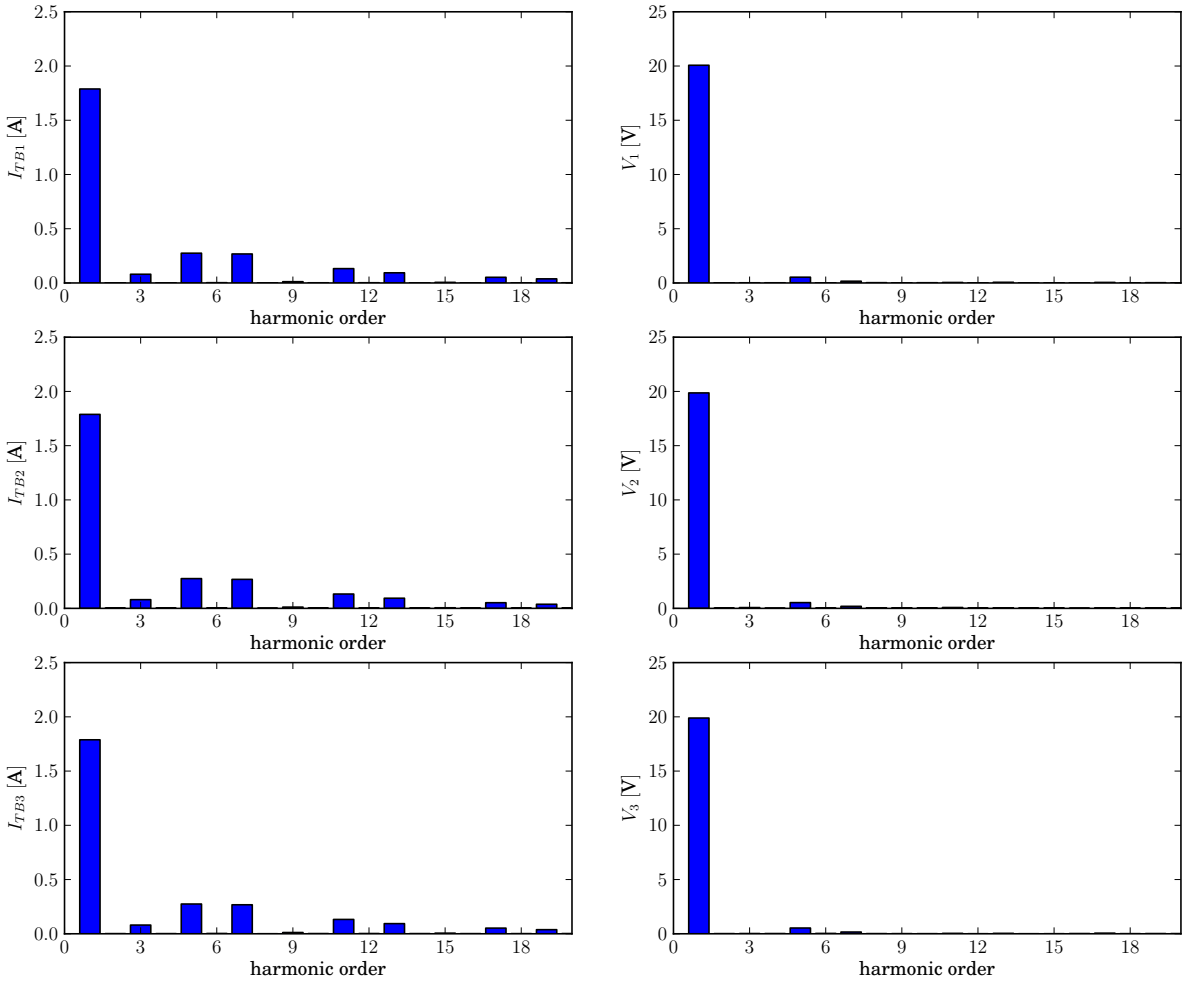
Slika 30: Transformer A waveforms, $I_{OUT} = 1.5\,\mathrm{A}$.



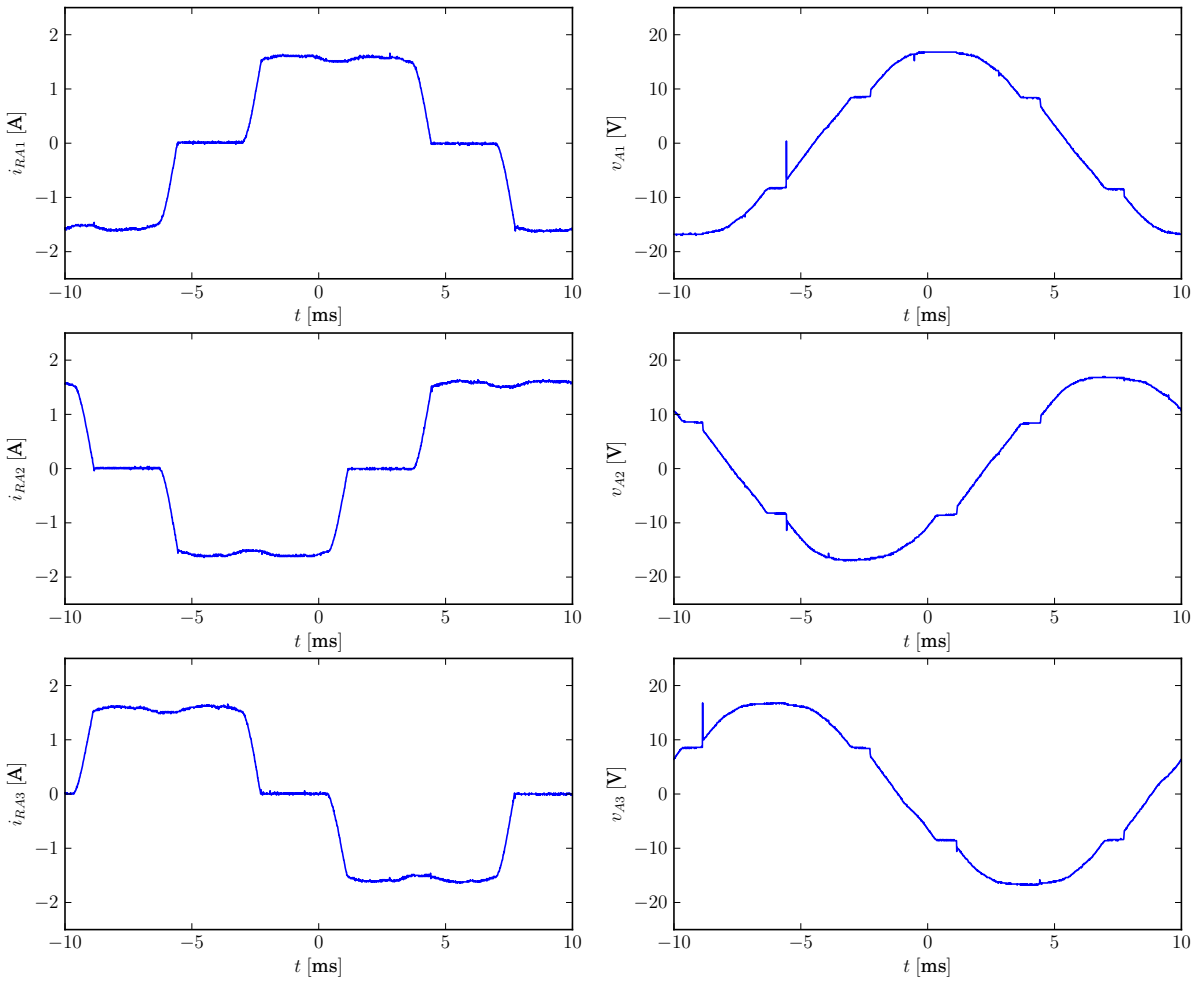
Slika 31: Transformer A spectra, $I_{OUT} = 1.5\,\mathrm{A}$.



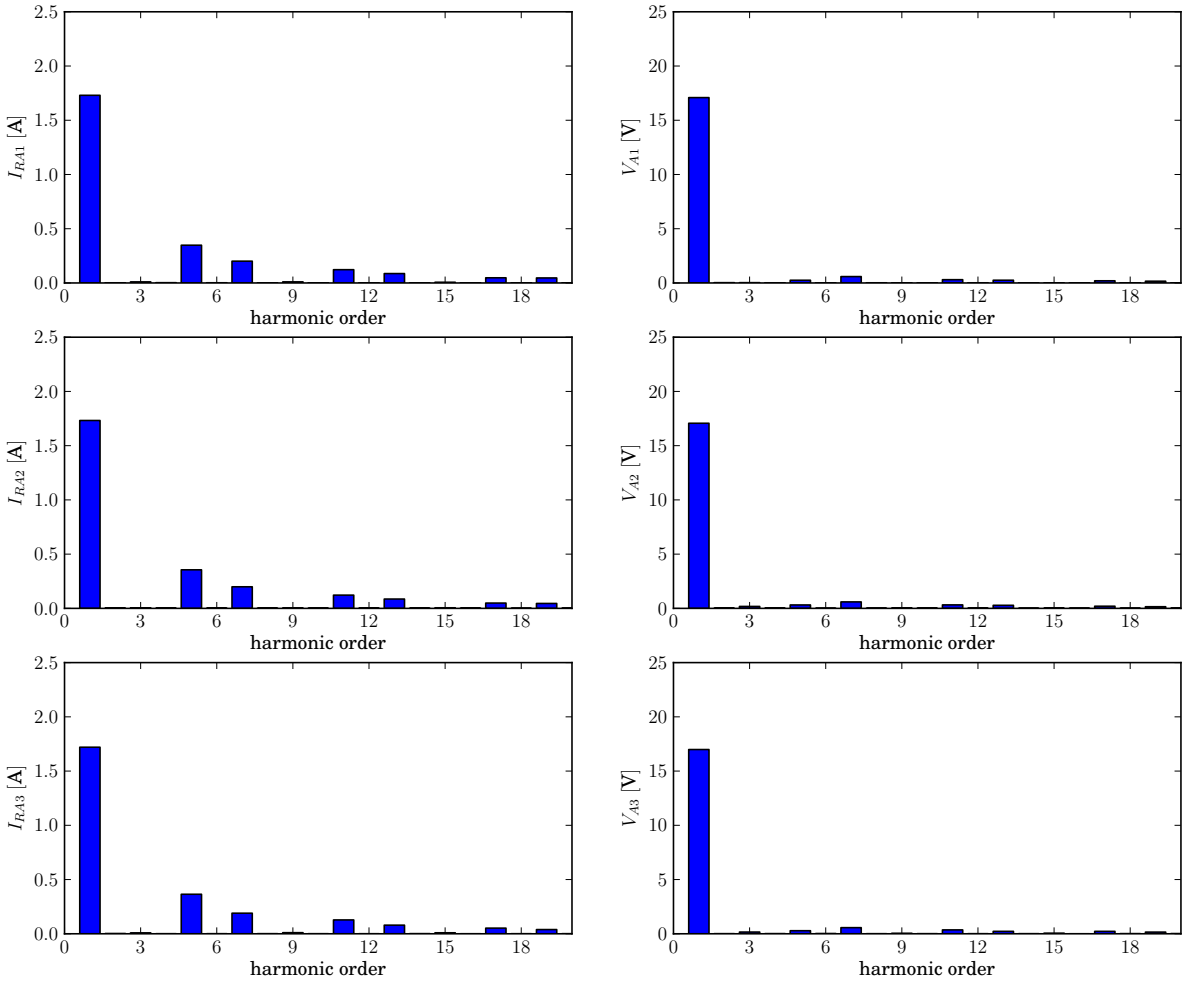
Slika 32: Transformer B waveforms, $I_{OUT} = 1.5\,\mathrm{A}$.



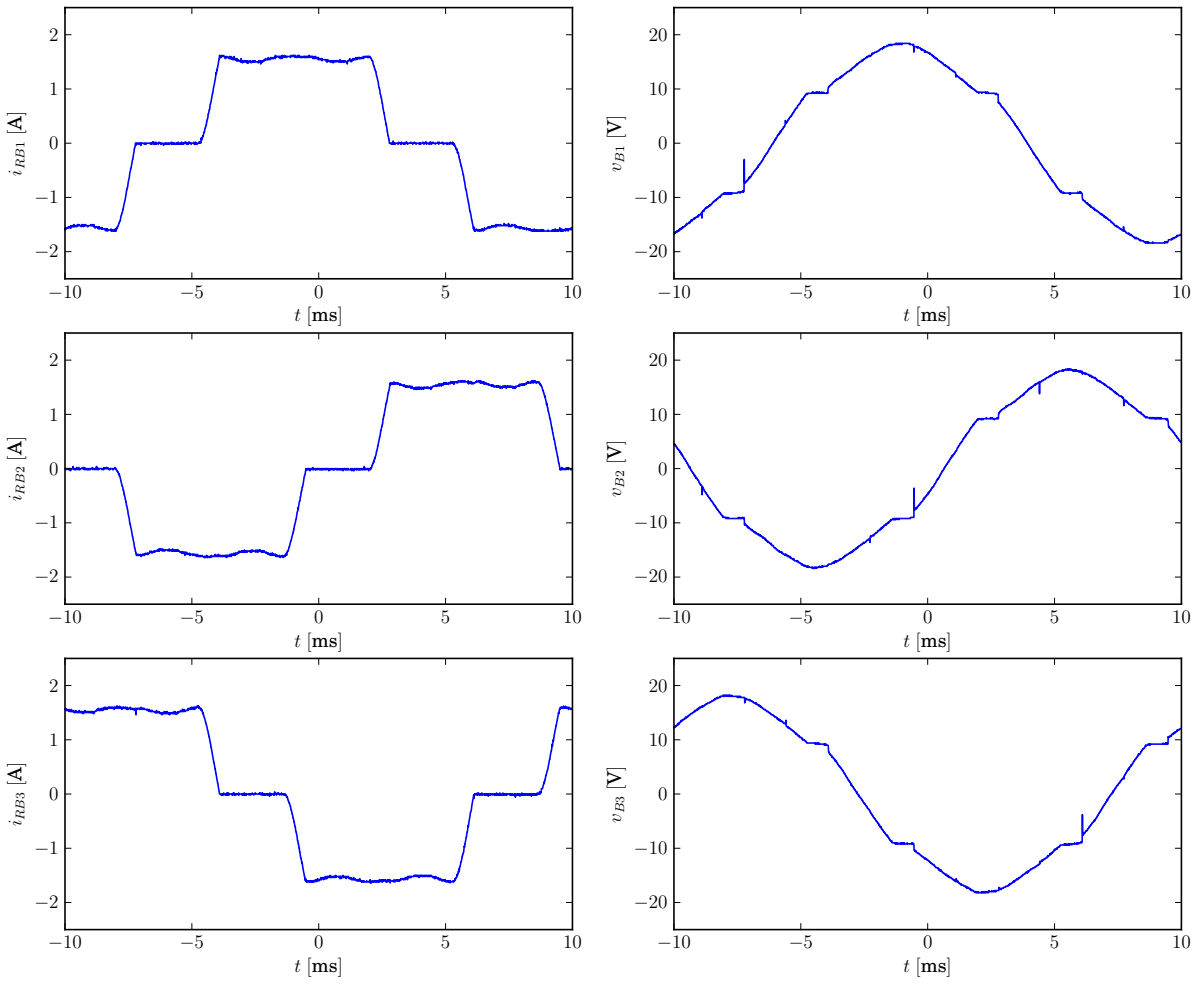
Slika 33: Transformer B spectra, $I_{OUT} = 1.5\,\mathrm{A}$.



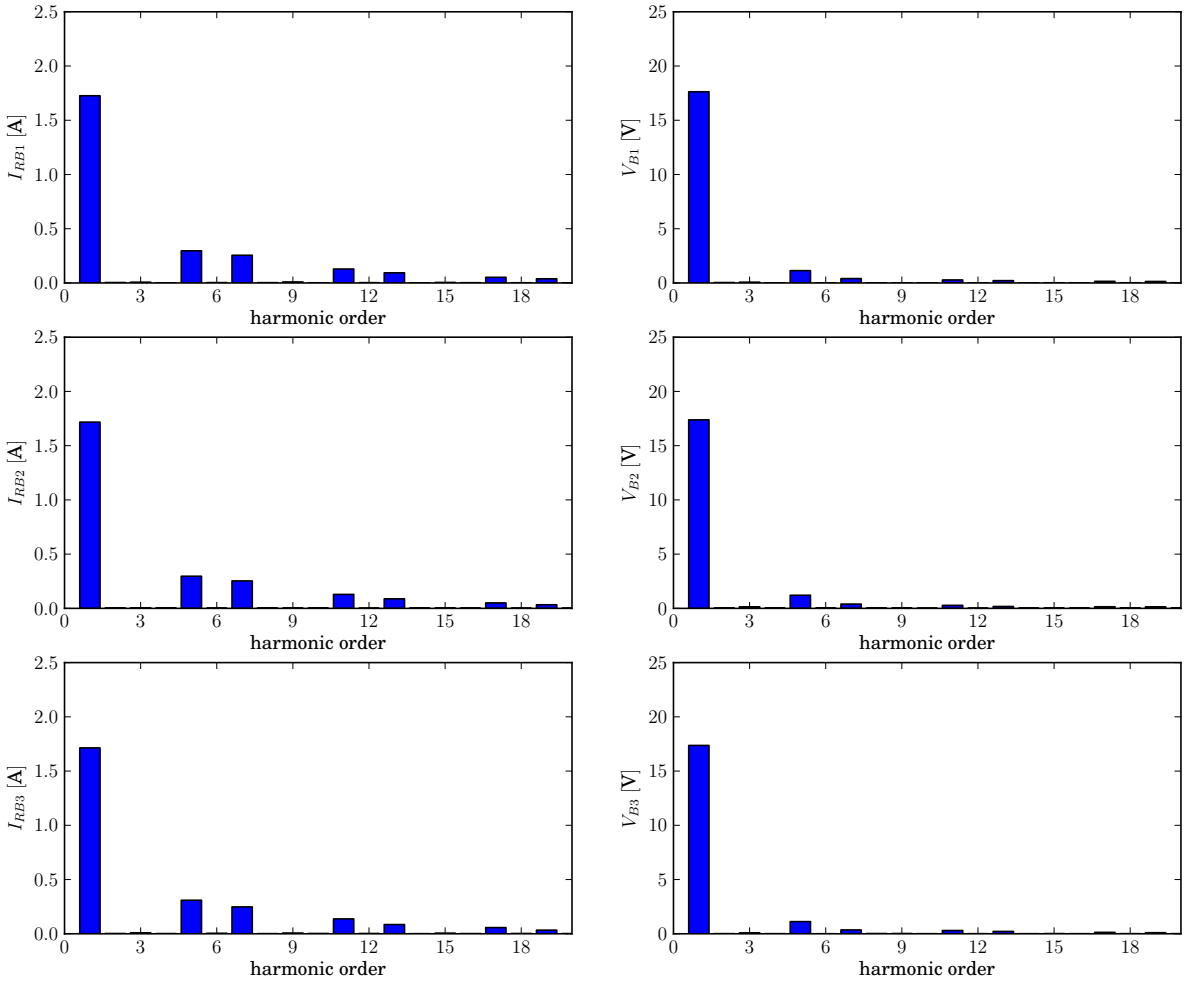
Slika 34: Rectifier A waveforms, $I_{OUT} = 1.5\,\mathrm{A}$.



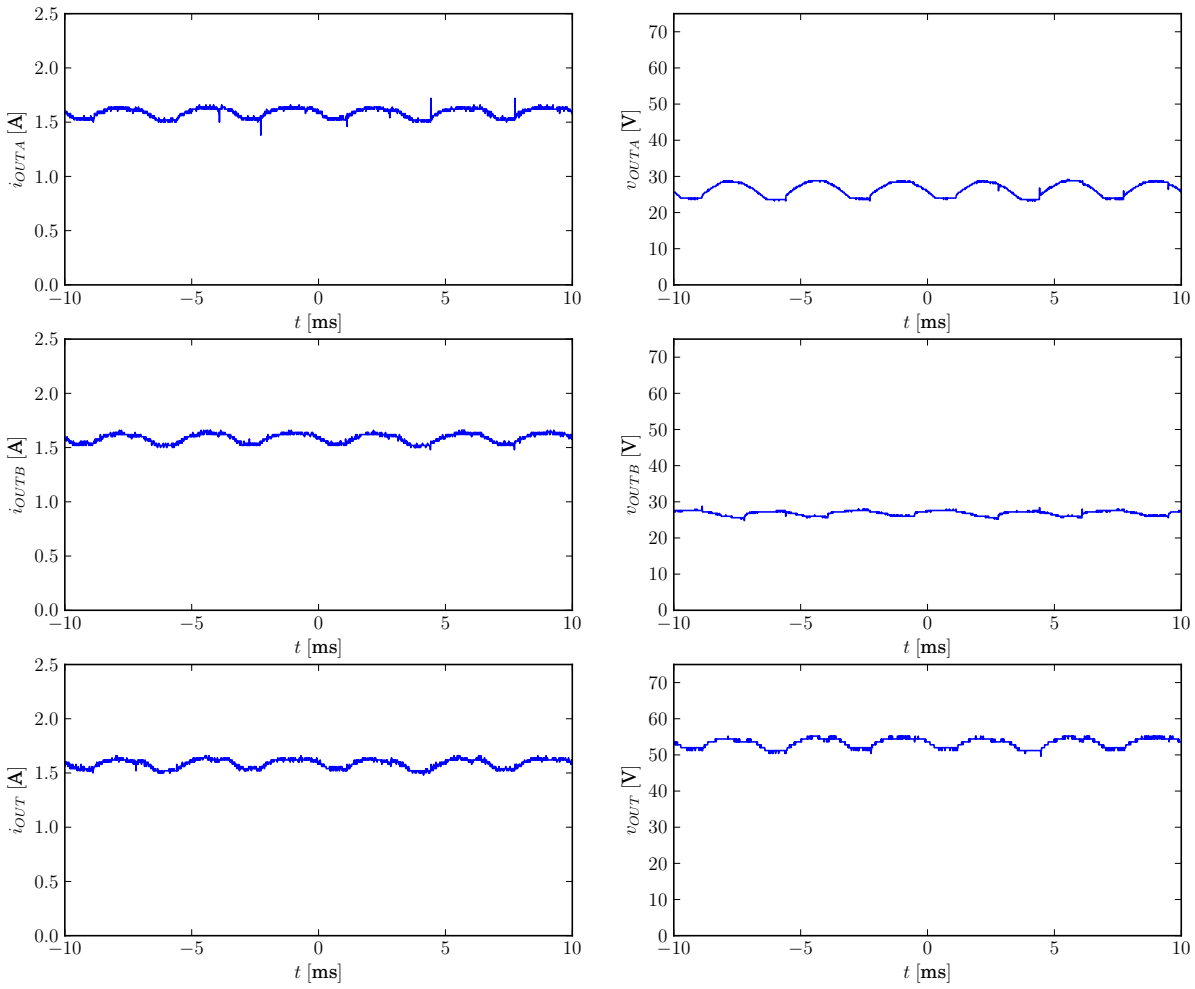
Slika 35: Rectifier A spectra, $I_{OUT} = 1.5\,\mathrm{A}$.



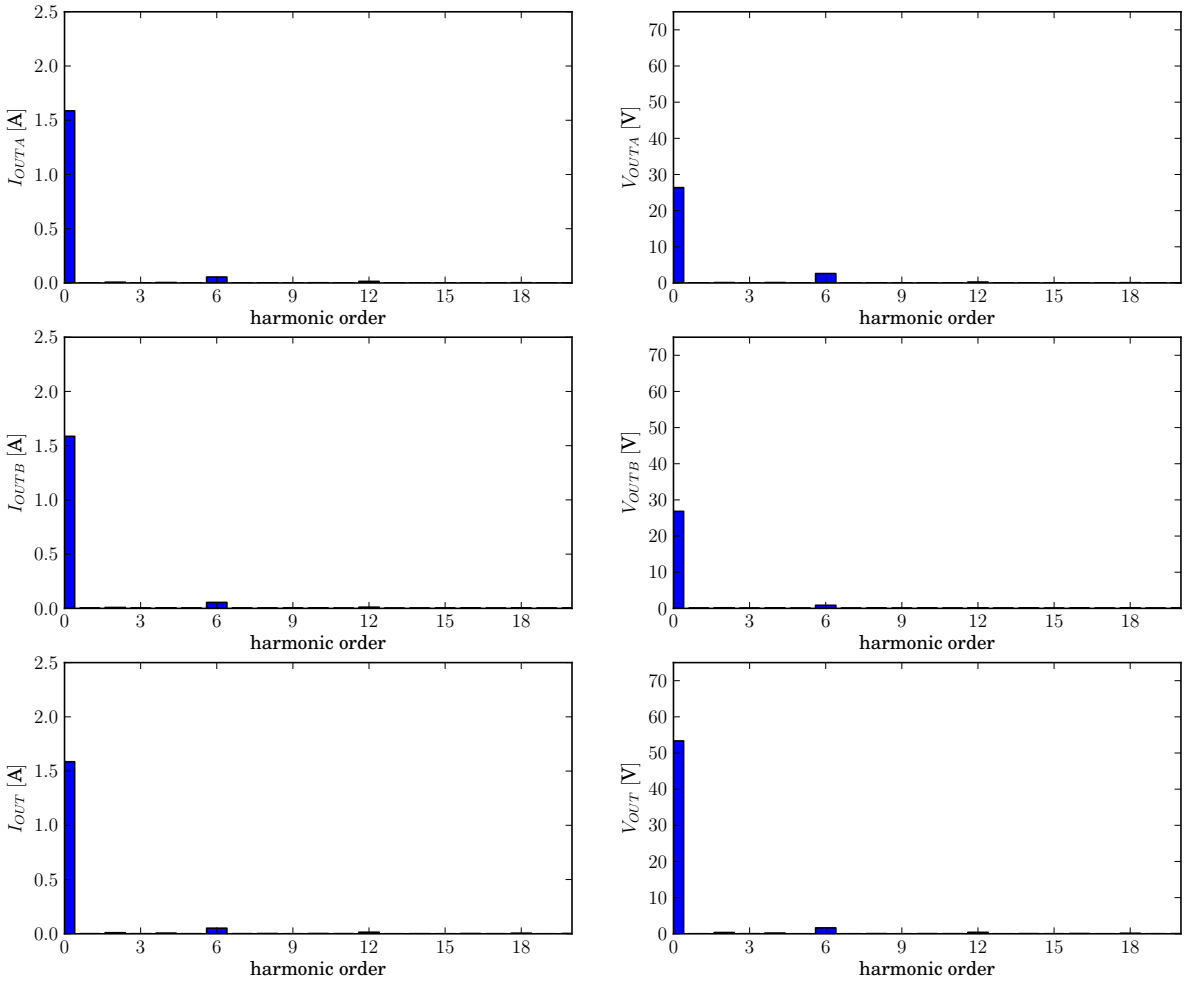
Slika 36: Rectifier B waveforms, $I_{OUT} = 1.5\,\mathrm{A}$.



Slika 37: Rectifier B spectra, $I_{OUT} = 1.5\,\mathrm{A}$.

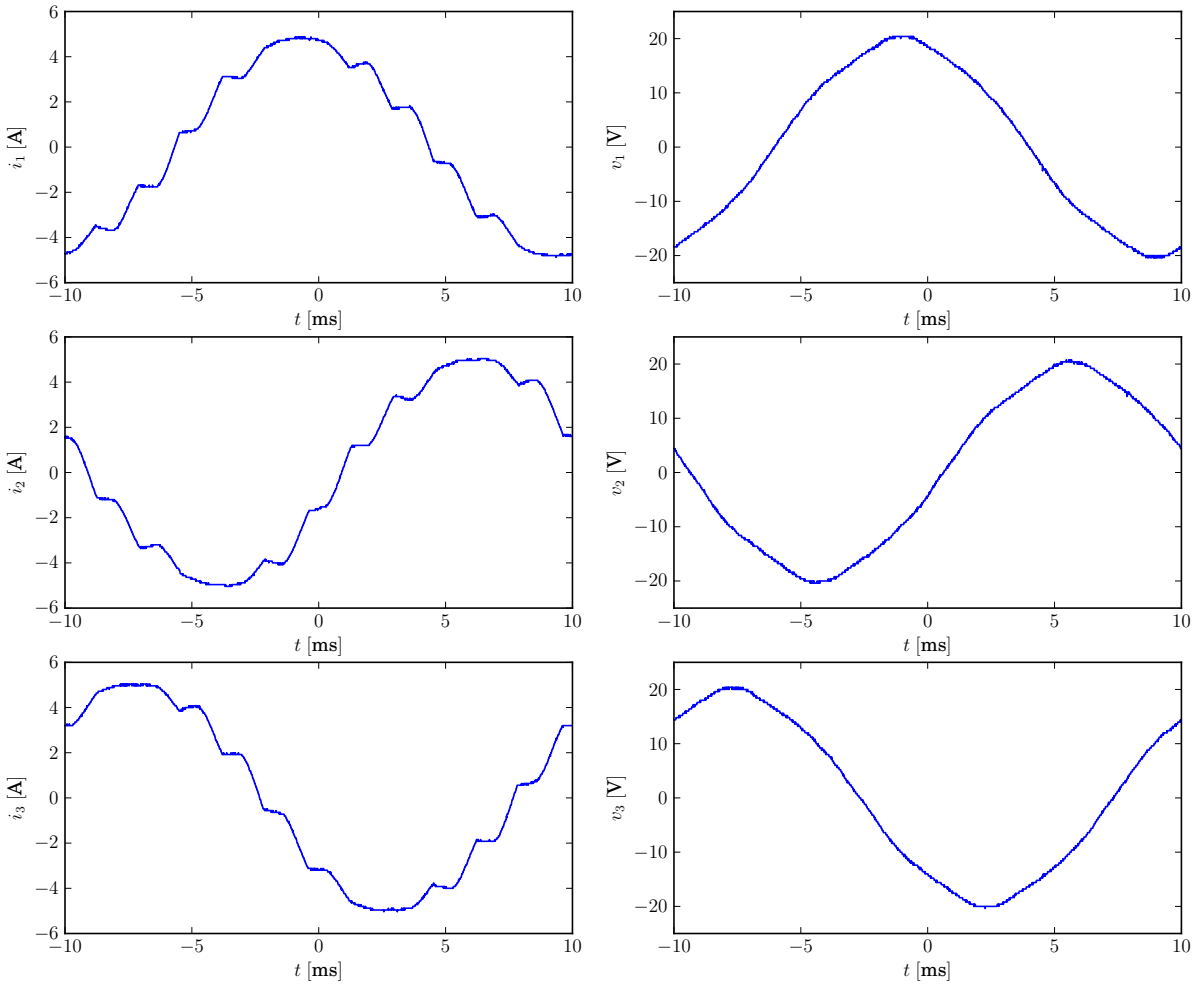


Slika 38: Output waveforms, $I_{OUT} = 1.5\,\mathrm{A}$.



Slika 39: Output spectra, $I_{OUT} = 1.5\,\mathrm{A}$.

5 Analiza za $I_{OUT} = 2\,\mathrm{A}$



Slika 40: Input waveforms, $I_{OUT} = 2\,\mathrm{A}$.

Tabela 22: $I_{OUT} = 2\,\mathrm{A}$, input

phase	1	2	3
$V_{k\,RMS}$ [V]	13.92	13.87	13.83
$THD\,(v_k)$ [%]	3.20	3.44	3.07
$I_{k\,RMS}$ [A]	3.37	3.55	3.55
$THD\,(i_k)$ [%]	8.07	8.12	7.48
P_k [W]	46.27	48.67	48.22
S_k [VA]	46.94	49.24	49.06
PF_k	0.9857	0.9884	0.9828
DPF_k	0.9890	0.9918	0.9859

Tabela 23: $I_{OUT} = 2\,\mathrm{A}$, transformer A

phase	1	2	3
$V_{k\,RMS}$ [V]	13.95	13.83	13.81
$THD\,(v_k)$ [%]	3.17	3.30	3.29
$I_{TA\,k\,RMS}$ [A]	1.71	1.85	1.76
$THD\,(i_{TA\,k})$ [%]	24.24	23.19	22.51
$P_{TA\,k}$ [W]	23.07	24.81	23.40
$S_{TA\,k}$ [VA]	23.81	25.54	24.36
$PF_{TA\,k}$	0.9690	0.9712	0.9605
$DPF_{TA\,k}$	0.9930	0.9927	0.9803

Tabela 24: $I_{OUT} = 2\,\mathrm{A}$, transformer B

phase	1	2	3
$V_{k\,RMS}$ [V]	13.95	13.81	13.82
$THD\,(v_k)$ [%]	3.29	3.26	2.82
$I_{TB\,k\,RMS}$ [A]	1.71	1.74	1.83
$THD\,(i_{TB\,k})$ [%]	22.43	23.08	21.66
$P_{TB\,k}$ [W]	22.85	23.20	24.32
$S_{TB\,k}$ [VA]	23.92	24.09	25.24
$PF_{TB\,k}$	0.9550	0.9632	0.9634
$DPF_{TB\,k}$	0.9833	0.9932	0.9891

Tabela 25: $I_{OUT} = 2\,\mathrm{A}$, rectifier A

phase	1	2	3
$V_{A\,k\,RMS}$ [V]	10.92	10.94	10.84
$THD\,(v_{A\,k})$ [%]	6.45	6.54	6.70
$I_{RA\,k\,RMS}$ [A]	1.68	1.69	1.67
$THD\,(i_{RA\,k})$ [%]	23.72	23.53	24.27
$P_{RA\,k}$ [W]	17.56	17.71	17.29
$S_{RA\,k}$ [VA]	18.32	18.44	18.07
$PF_{RA\,k}$	0.9585	0.9602	0.9569
$DPF_{RA\,k}$	0.9981	0.9977	0.9978

Tabela 26: $I_{OUT} = 2\,\mathrm{A}$, rectifier B

phase	1	2	3
$V_{B\,k\,RMS}$ [V]	11.48	11.35	11.32
$THD\,(v_{B\,k})$ [%]	9.27	9.25	9.33
$I_{RB\,k\,RMS}$ [A]	1.67	1.67	1.66
$THD\,(i_{RB\,k})$ [%]	22.92	23.04	23.18
$P_{RB\,k}$ [W]	18.24	18.02	17.87
$S_{RB\,k}$ [VA]	19.18	18.95	18.80
$PF_{RB\,k}$	0.9513	0.9508	0.9505
$DPF_{RB\,k}$	0.9986	0.9985	0.9985

Tabela 27: $I_{OUT} = 2\,\mathrm{A}$, output

output	rectifier A	rectifier B	complete output
I_{OUT} [A]	2.13	2.13	2.13
V_{OUT} [V]	23.41	24.33	47.94
P_{OUT} [W]	49.87	51.79	102.23

Snage:

1. $P_{IN} = 143.15\,\mathrm{W}$
2. $P_{TA} = 71.28\,\mathrm{W}$
3. $P_{TB} = 70.37\,\mathrm{W}$
4. $P_{RA} = 52.56\,\mathrm{W}$
5. $P_{RB} = 54.14\,\mathrm{W}$
6. $P_{OUTA} = 49.87\,\mathrm{W}$
7. $P_{OUTB} = 51.79\,\mathrm{W}$
8. $P_{OUT} = 102.23\,\mathrm{W}$

Gubici:

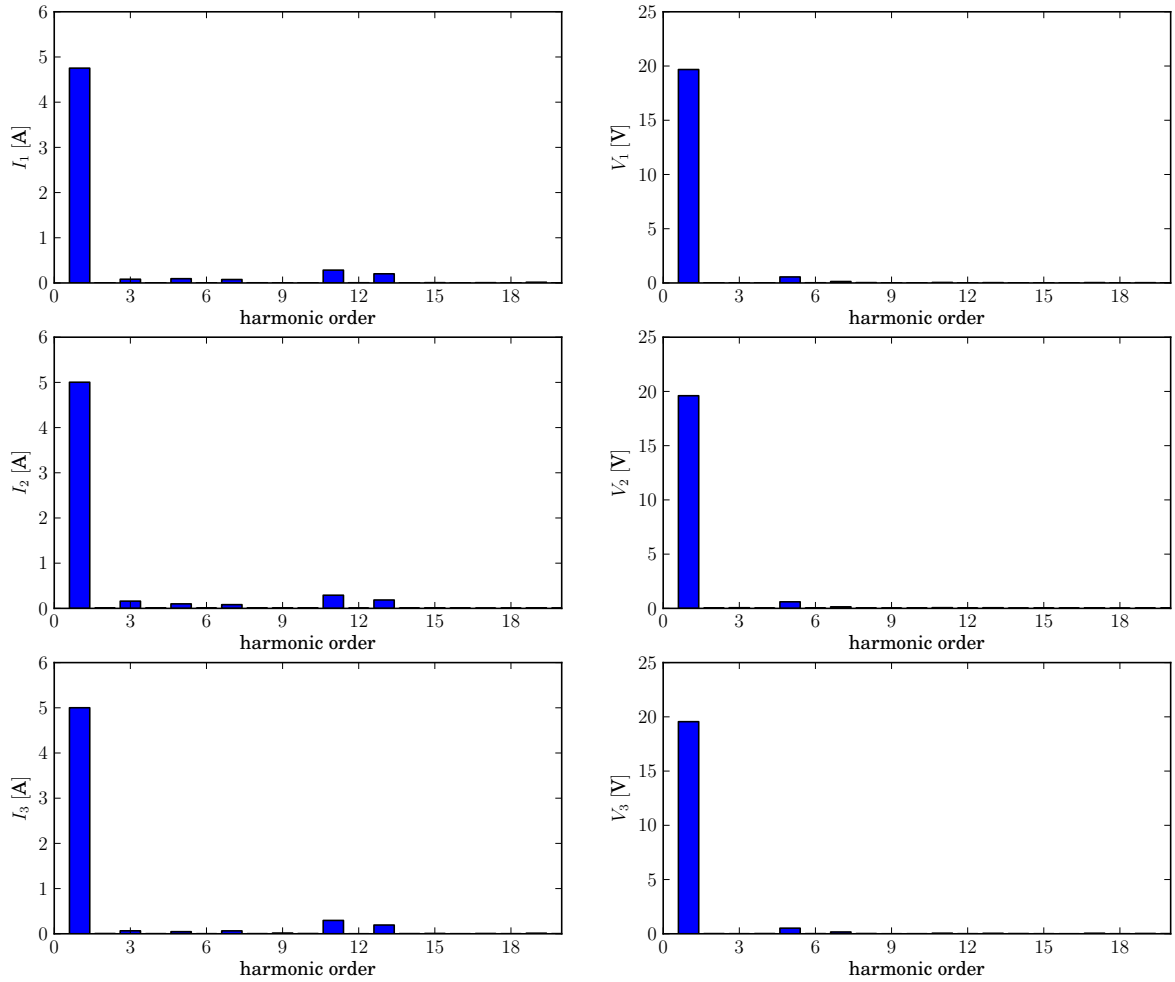
1. $P_{loss\,TA} = 18.72\,\mathrm{W}$
2. $P_{loss\,TB} = 16.23\,\mathrm{W}$
3. $P_{loss\,RA} = 2.68\,\mathrm{W}$
4. $P_{loss\,RB} = 2.34\,\mathrm{W}$
5. $P_{loss} = P_{IN} - P_{OUT} = 40.93\,\mathrm{W}$

Koeficijenti korisnog dejstva:

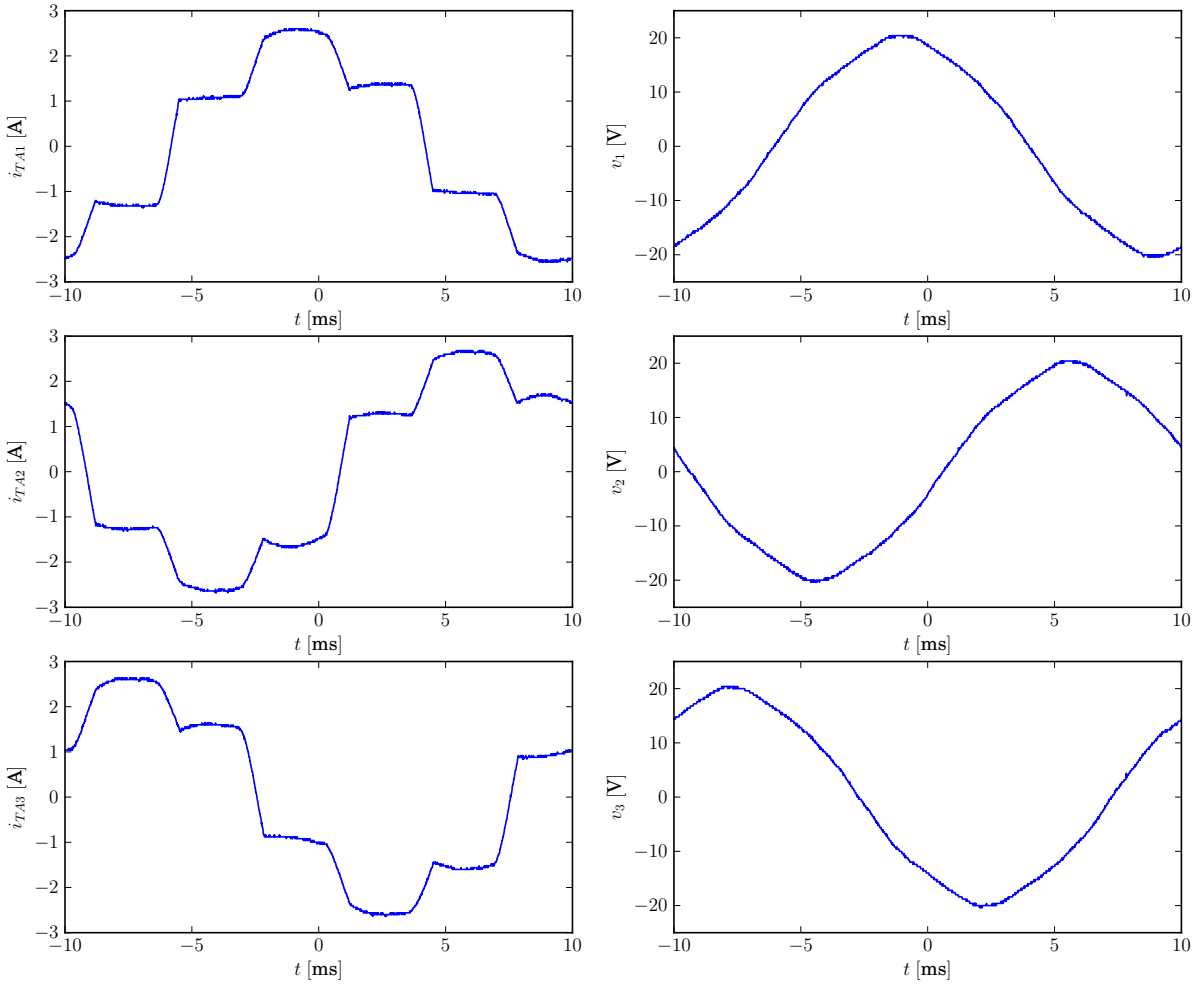
1. $\eta_{TA} = 73.73\%$
2. $\eta_{TB} = 76.94\%$
3. $\eta_{RA} = 94.89\%$
4. $\eta_{RB} = 95.67\%$
5. $\eta = 71.41\%$

Nekonzistentnosti u snagama:

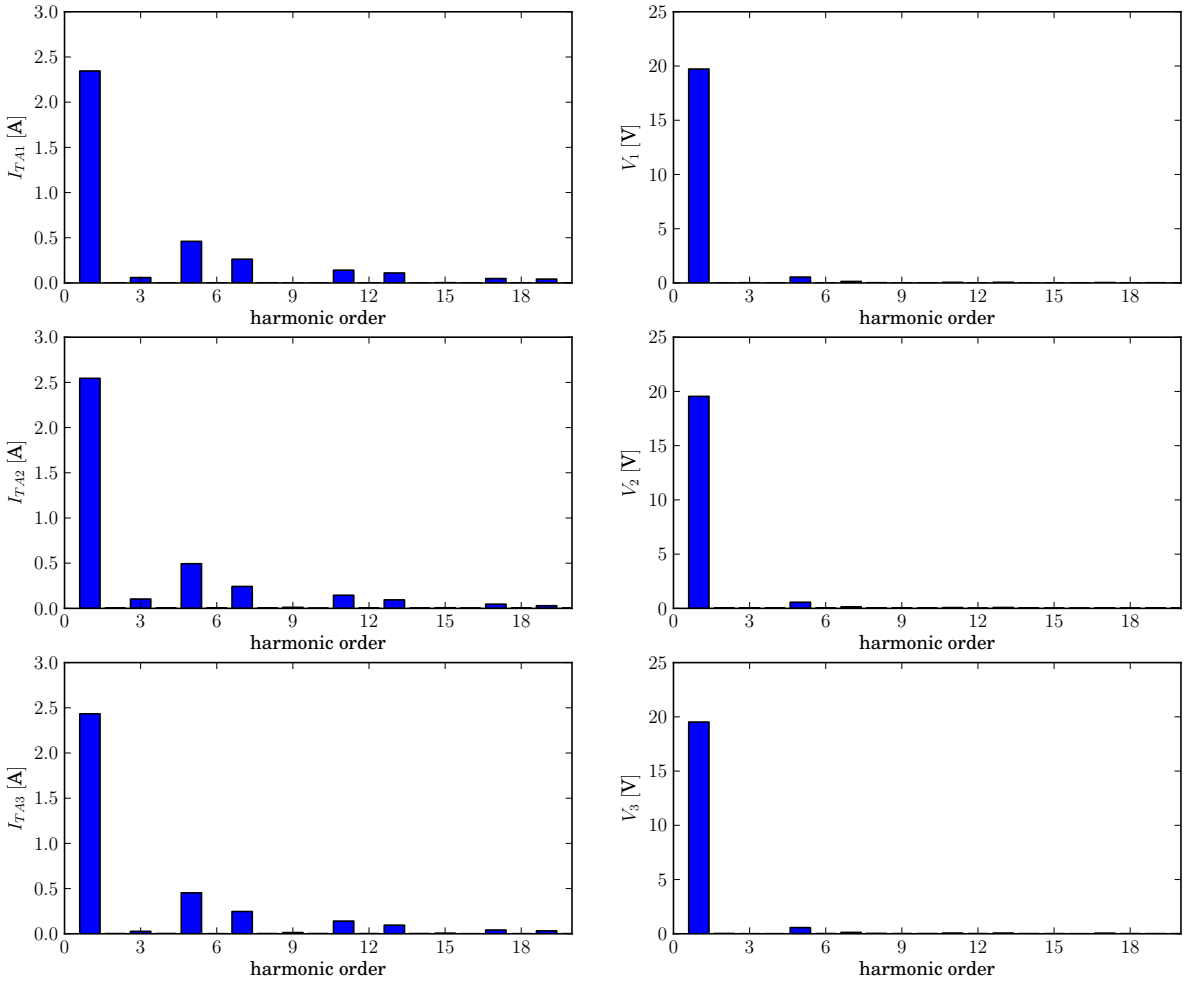
1. $\Delta P_{IN} = P_{IN} - P_{TA} - P_{TB} = 1.51\,\mathrm{W}$
2. $\Delta P_{OUT} = P_{OUT} - P_{OUTA} - P_{OUTB} = 0.56\,\mathrm{W}$
3. $\Delta P_{loss} = P_{IN} - P_{OUT} - \Sigma P_{loss} = 0.94\,\mathrm{W}$



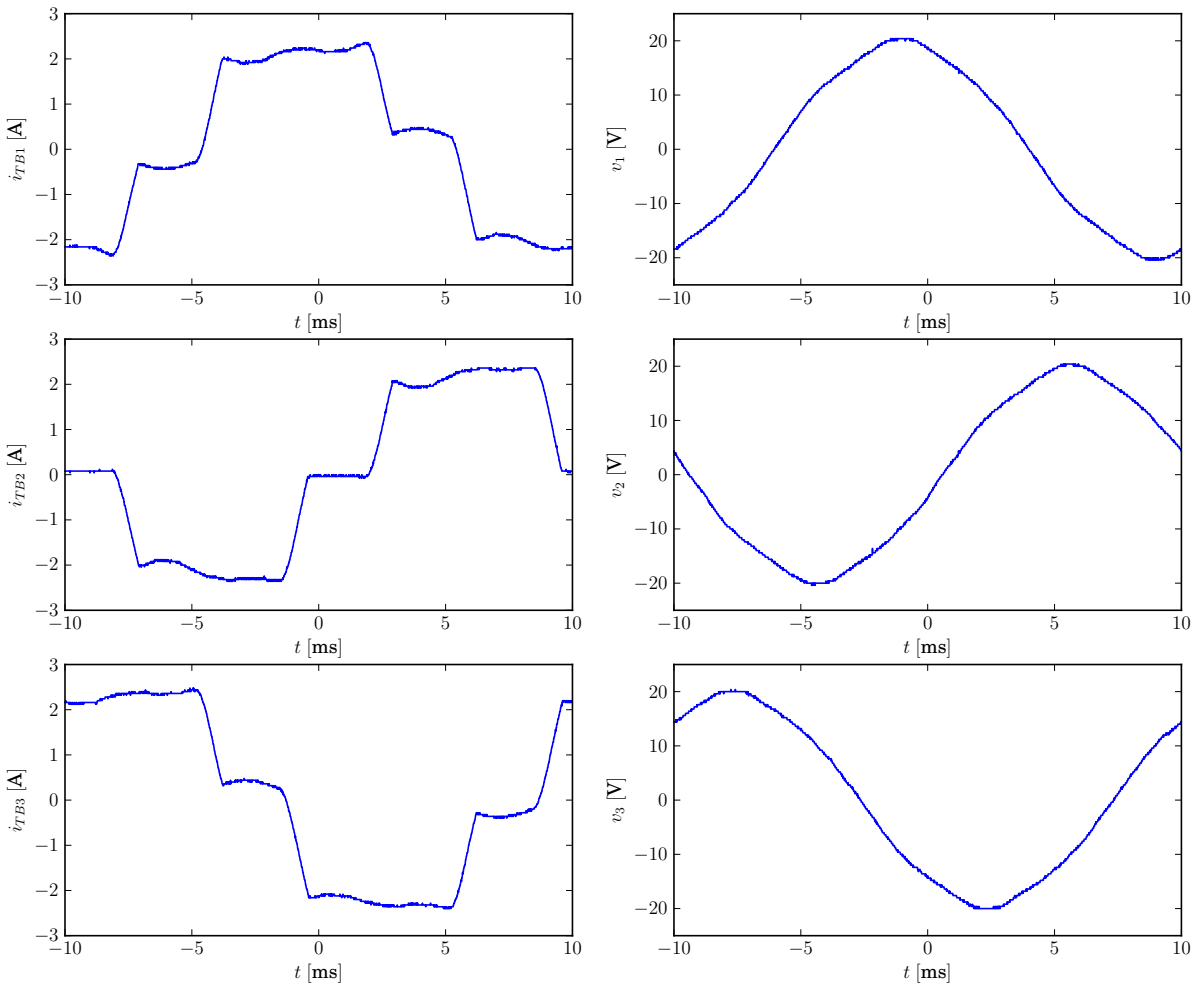
Slika 41: Input spectra, $I_{OUT} = 2\,\mathrm{A}$.



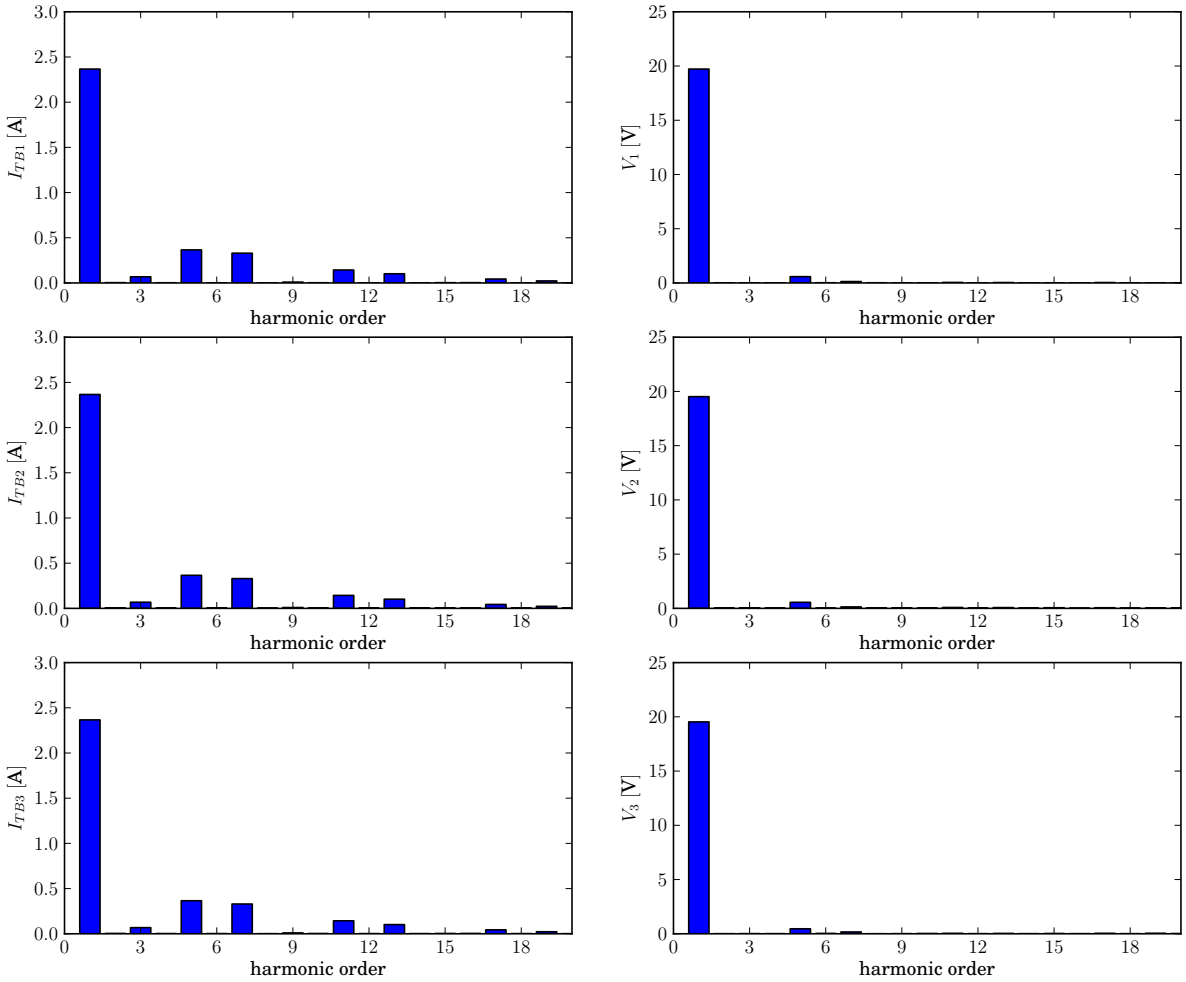
Slika 42: Transformer A waveforms, $I_{OUT} = 2\,\mathrm{A}$.



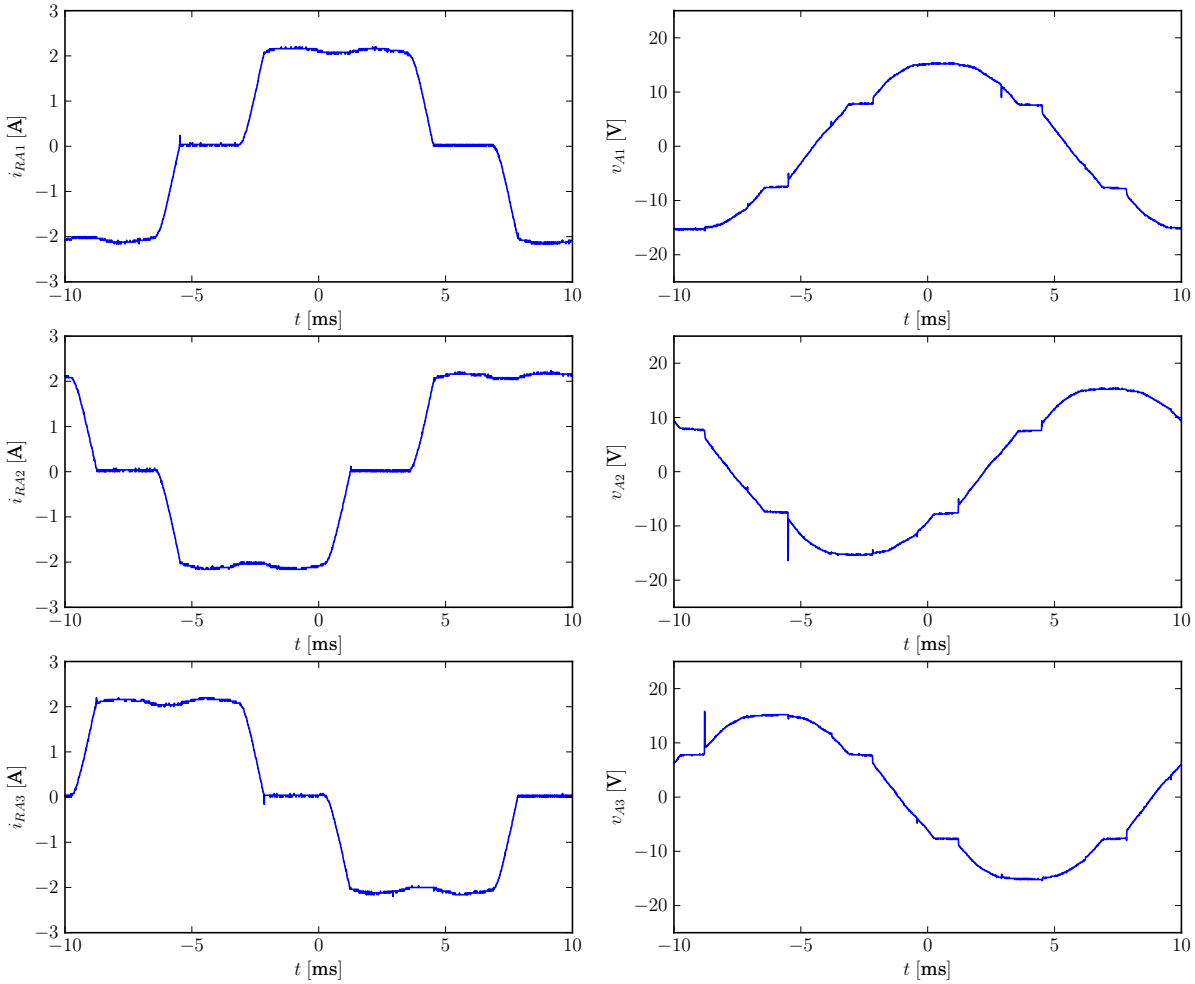
Slika 43: Transformer A spectra, $I_{OUT} = 2\,\mathrm{A}$.



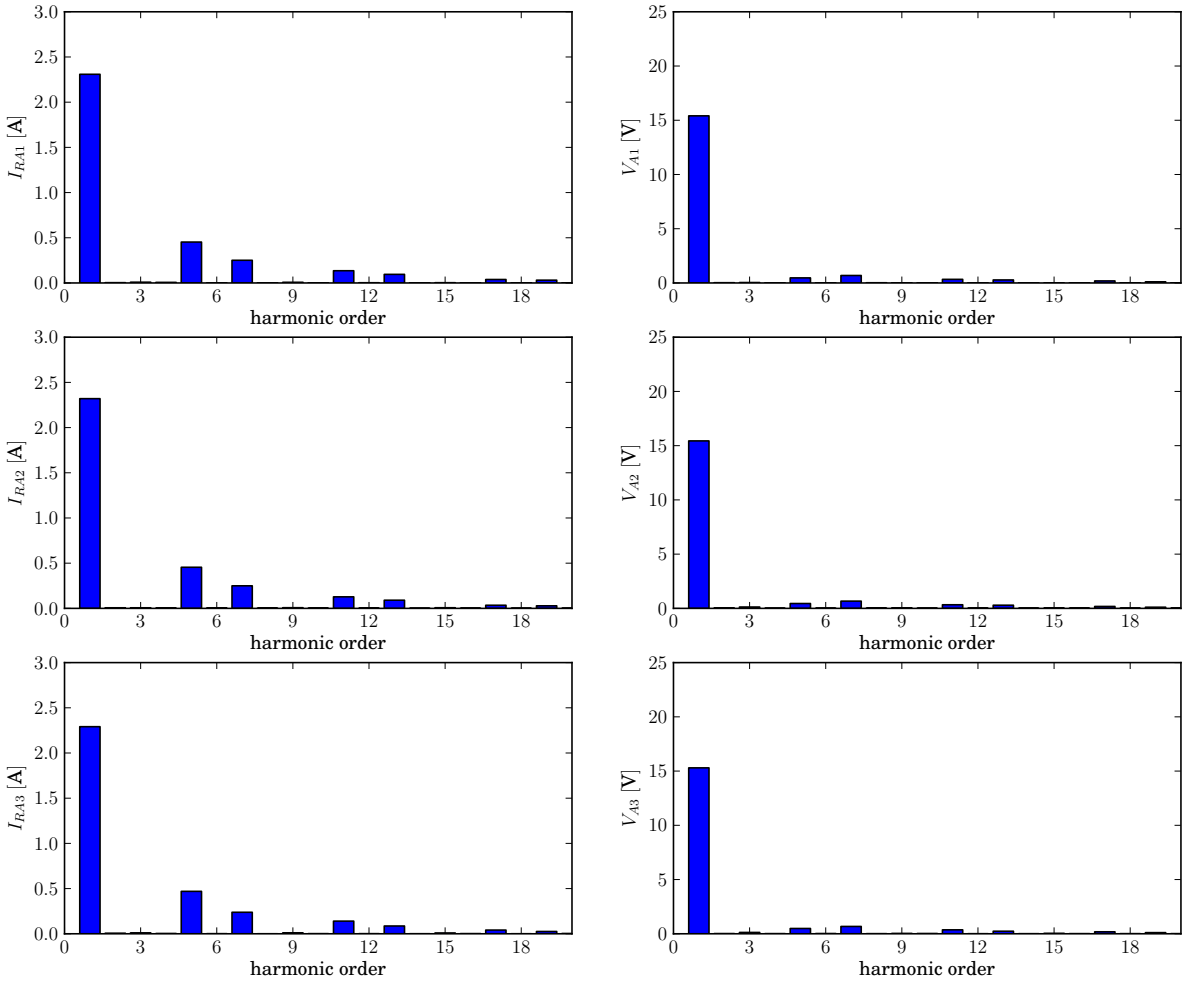
Slika 44: Transformer B waveforms, $I_{OUT} = 2\,\mathrm{A}$.



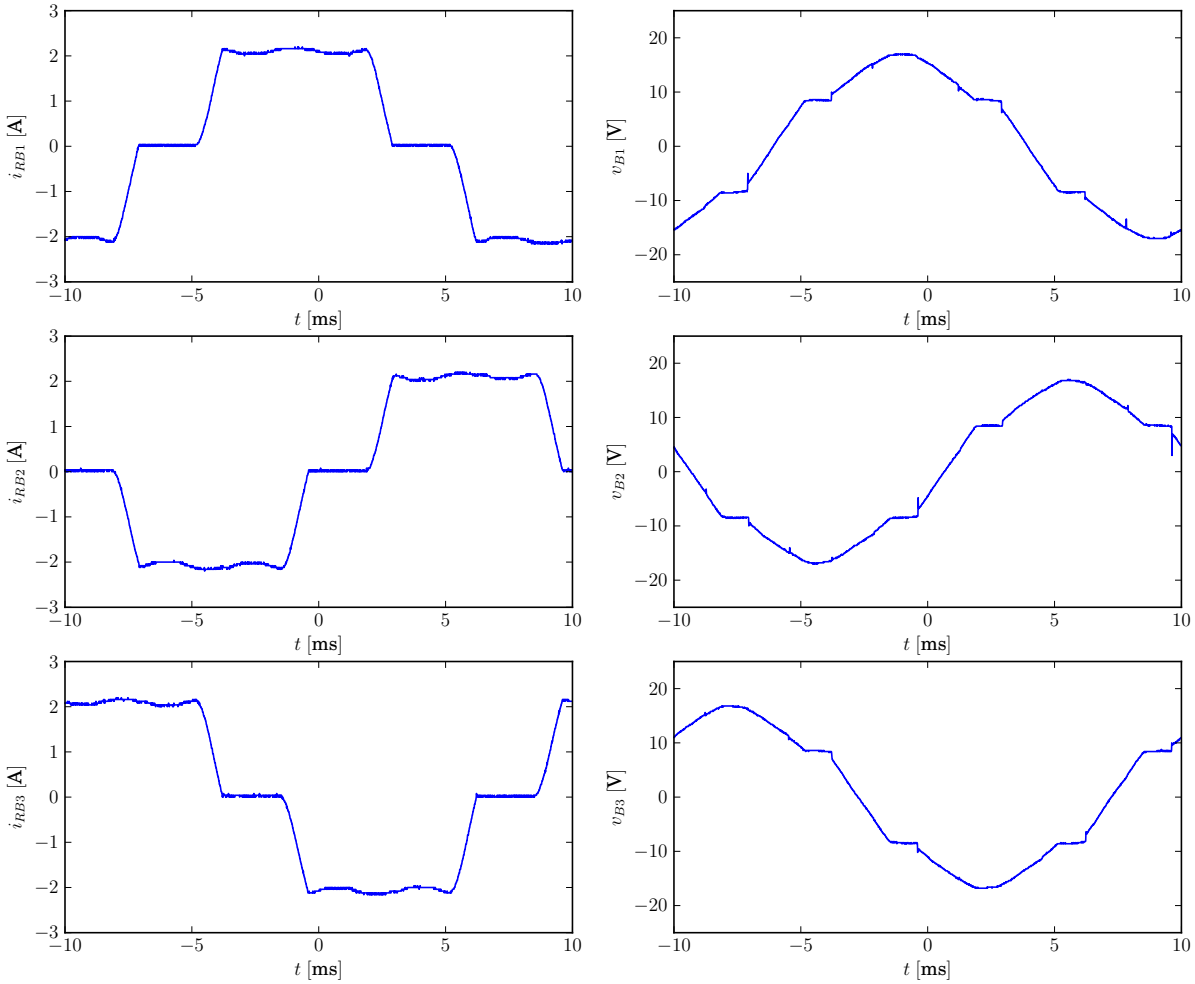
Slika 45: Transformer B spectra, $I_{OUT} = 2\,\mathrm{A}$.



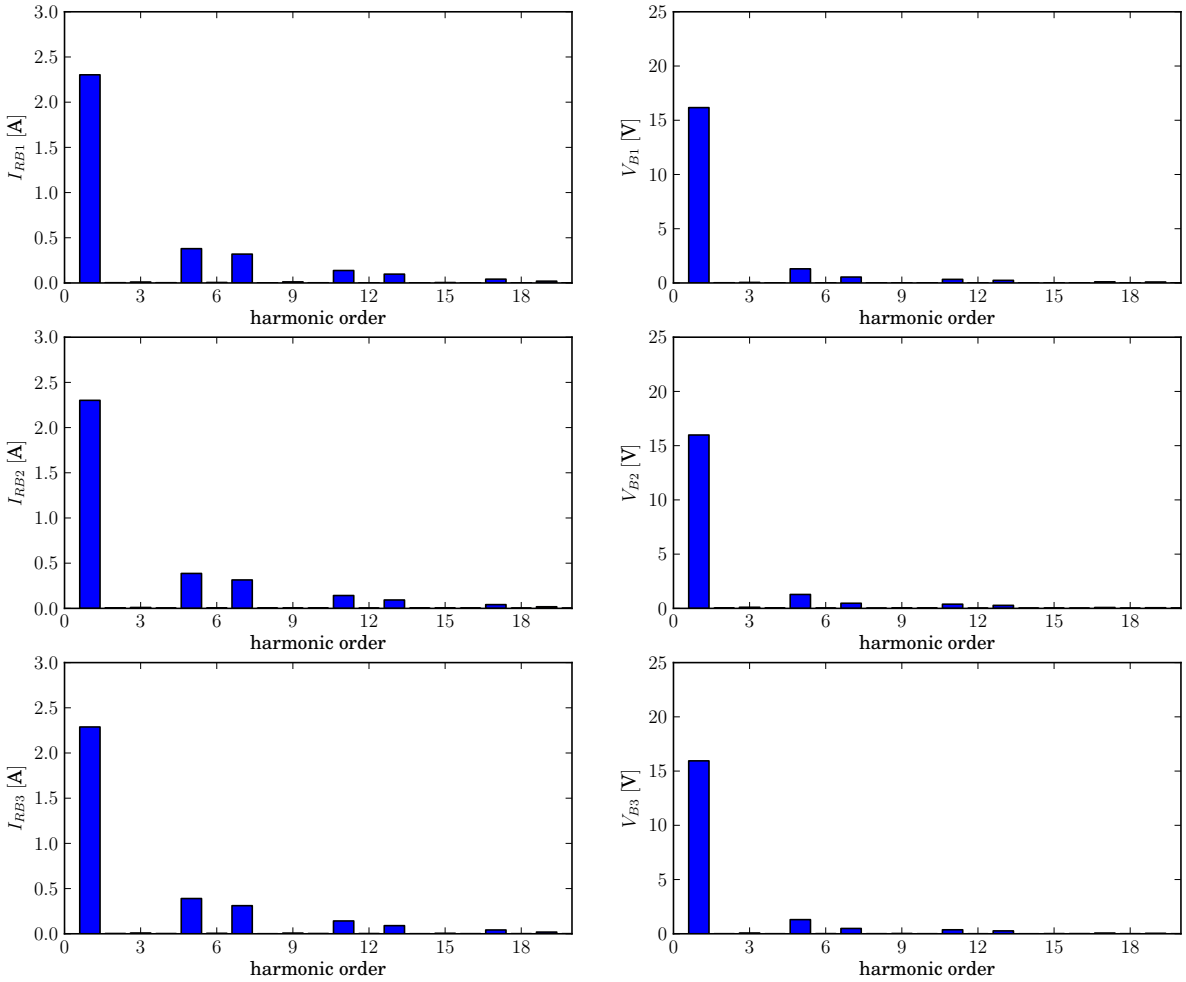
Slika 46: Rectifier A waveforms, $I_{OUT} = 2\,\mathrm{A}$.



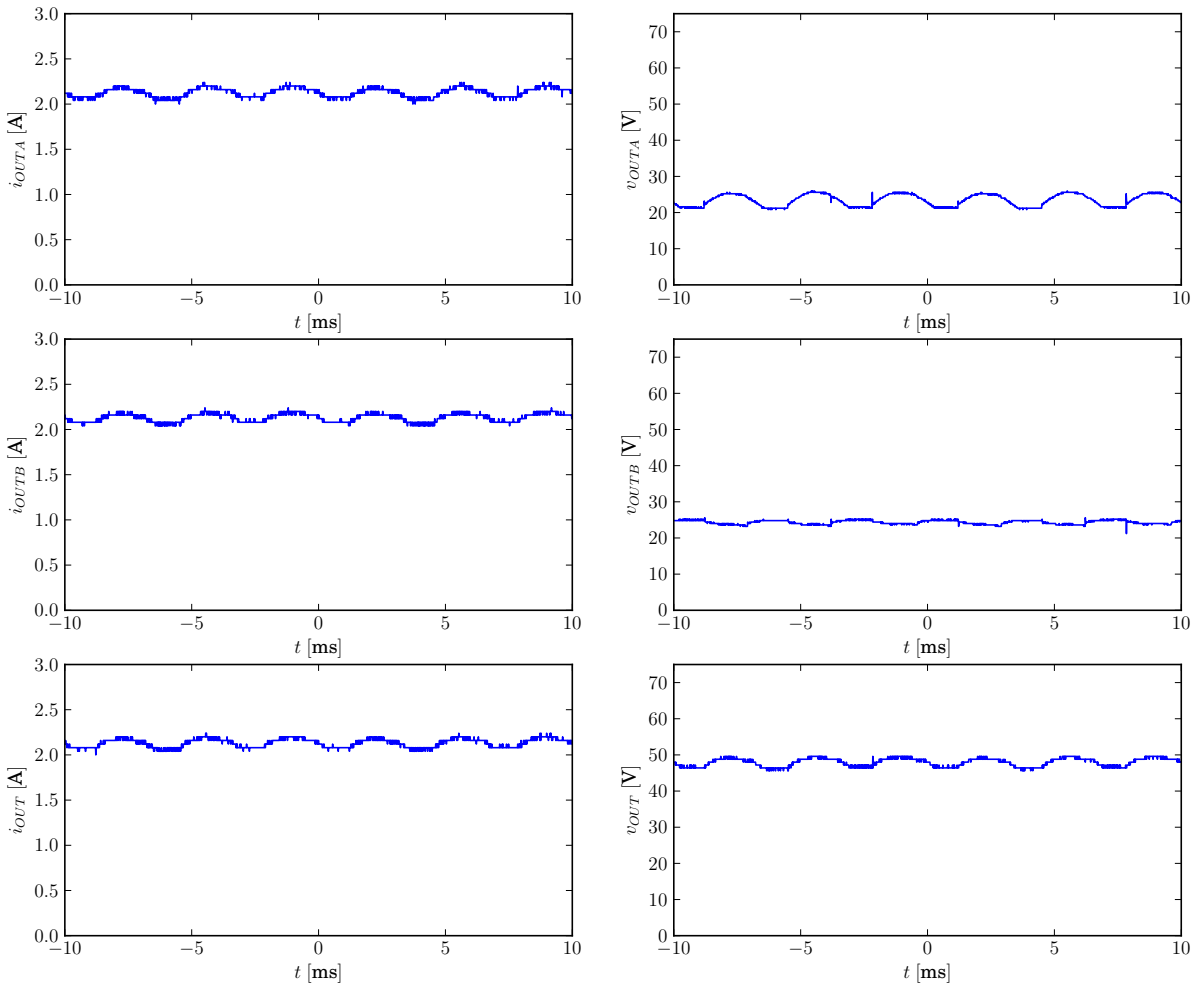
Slika 47: Rectifier A spectra, $I_{OUT} = 2\,\mathrm{A}$.



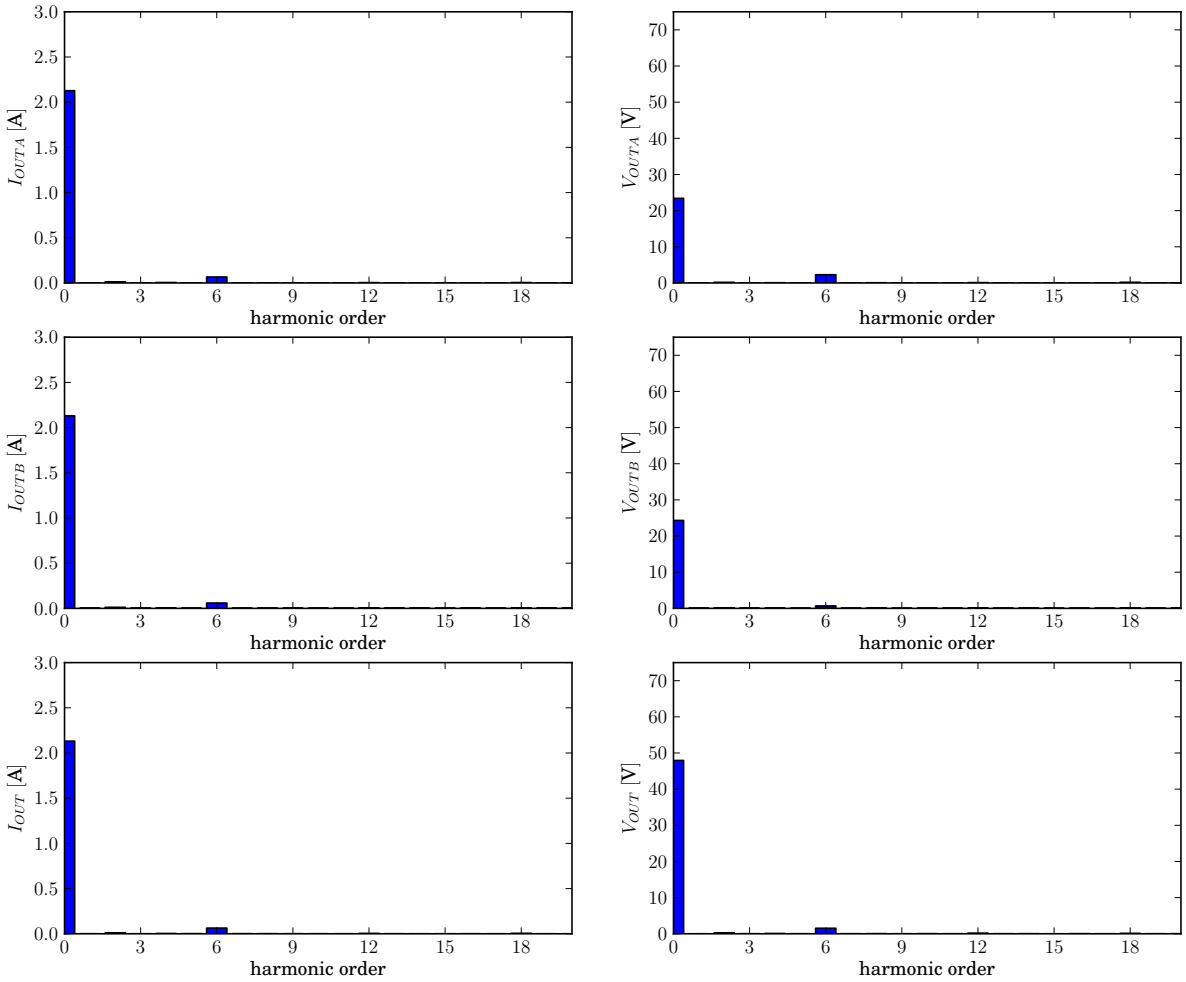
Slika 48: Rectifier B waveforms, $I_{OUT} = 2\,\mathrm{A}$.



Slika 49: Rectifier B spectra, $I_{OUT} = 2\,\mathrm{A}$.

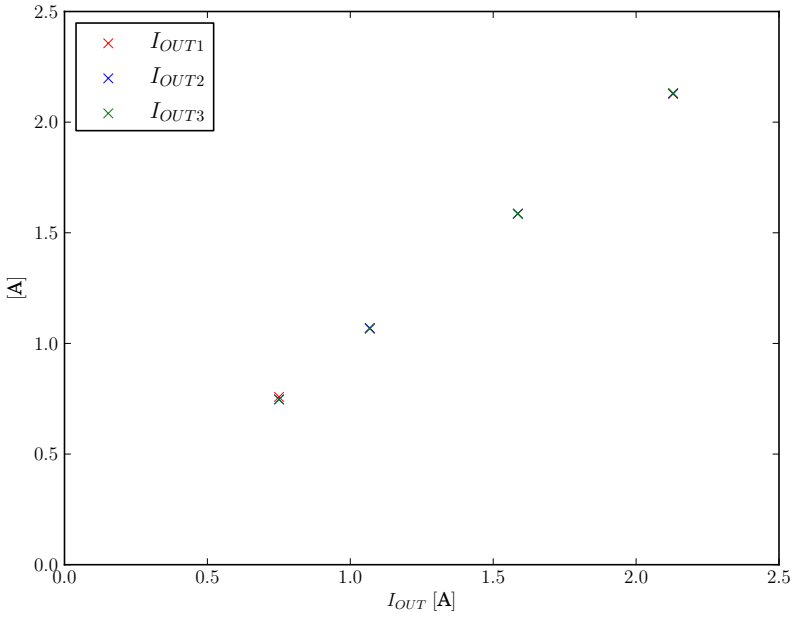


Slika 50: Output waveforms, $I_{OUT} = 2\,\mathrm{A}$.



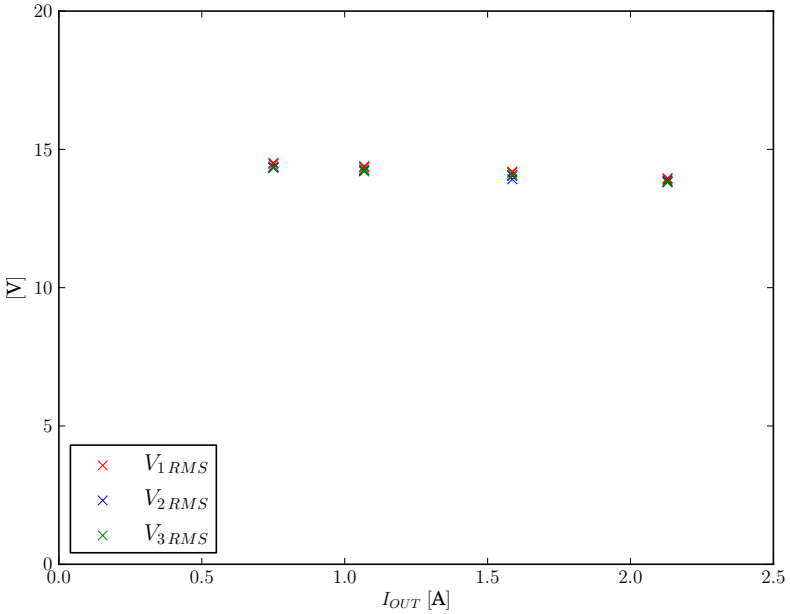
Slika 51: Output spectra, $I_{OUT} = 2\,\mathrm{A}$.

6 Zavisnosti od I_{OUT}

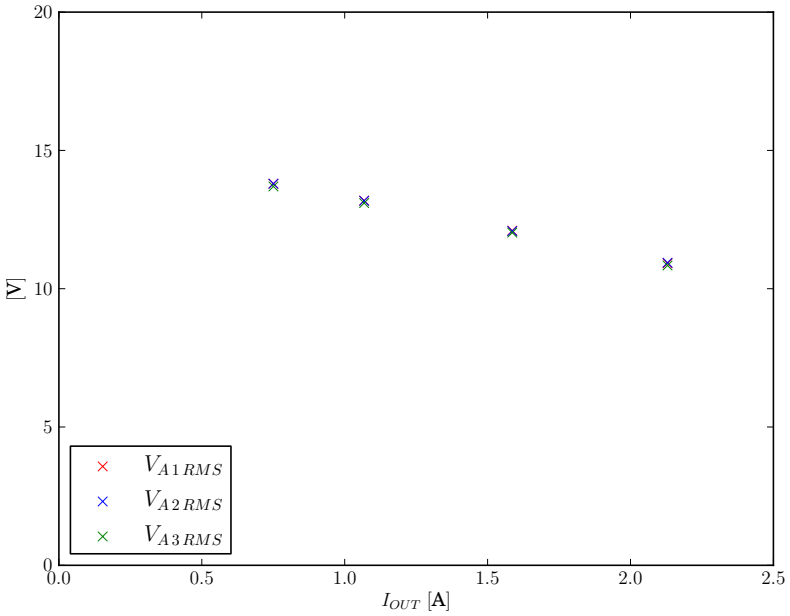


Slika 52: Tri puta merena I_{OUT} u zavisnosti od srednje vrednosti.

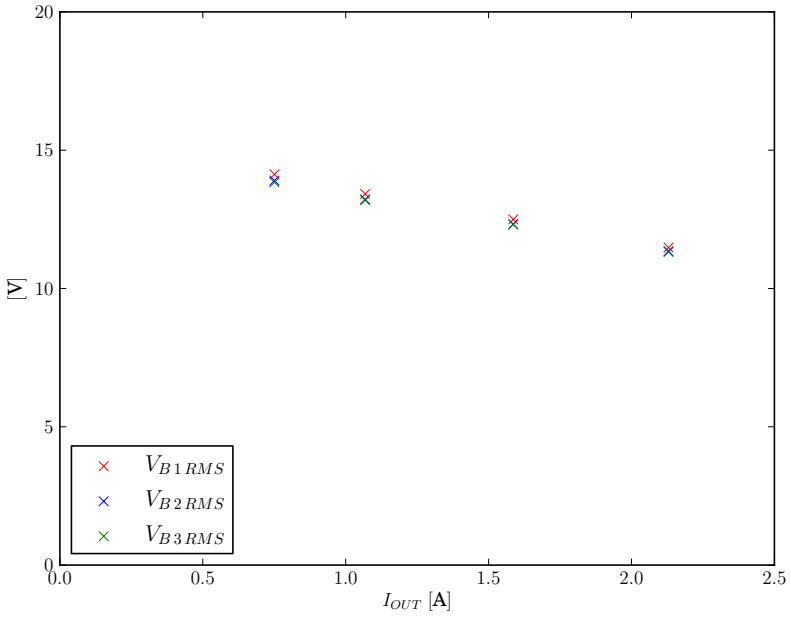
6.1 Efektivne vrednosti napona



Slika 53: Efektivne vrednosti ulaznih napona.

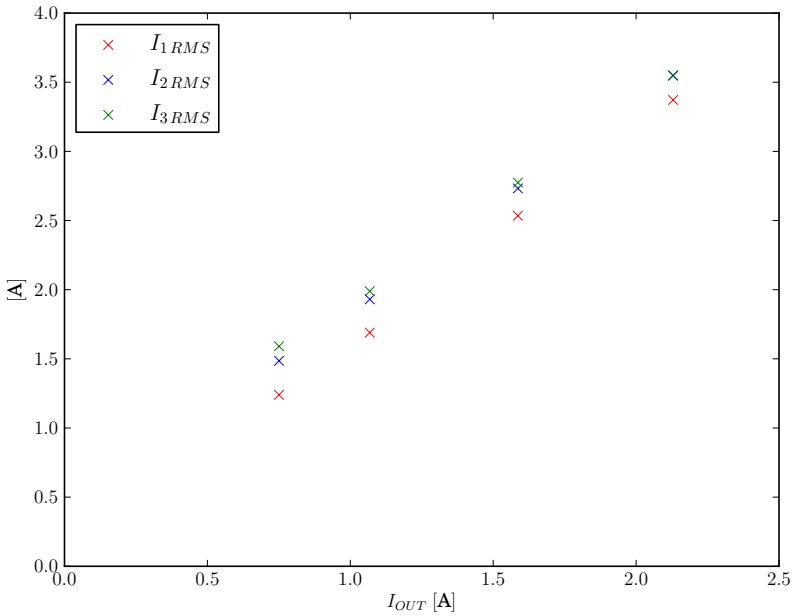


Slika 54: Efektivne vrednosti izlaznih napona transformatora A.

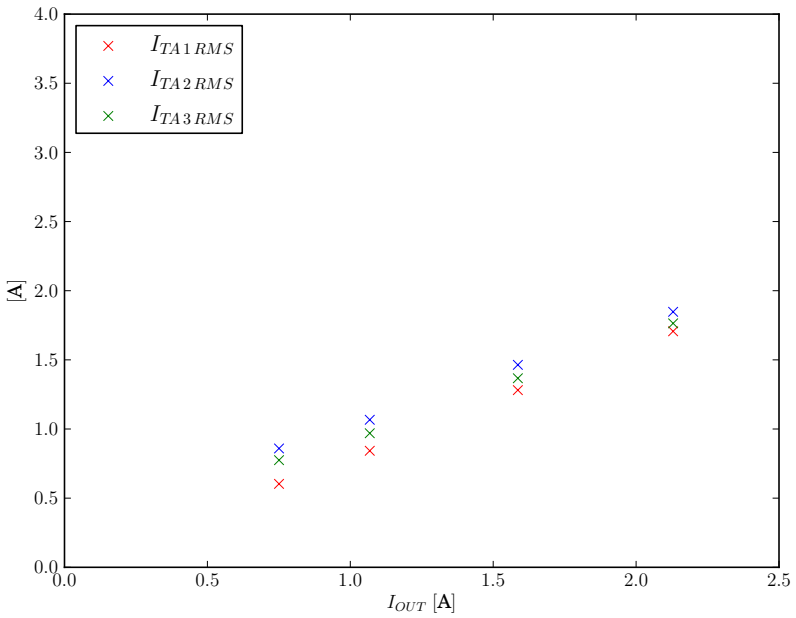


Slika 55: Efektivne vrednosti izlaznih napona transformatora B.

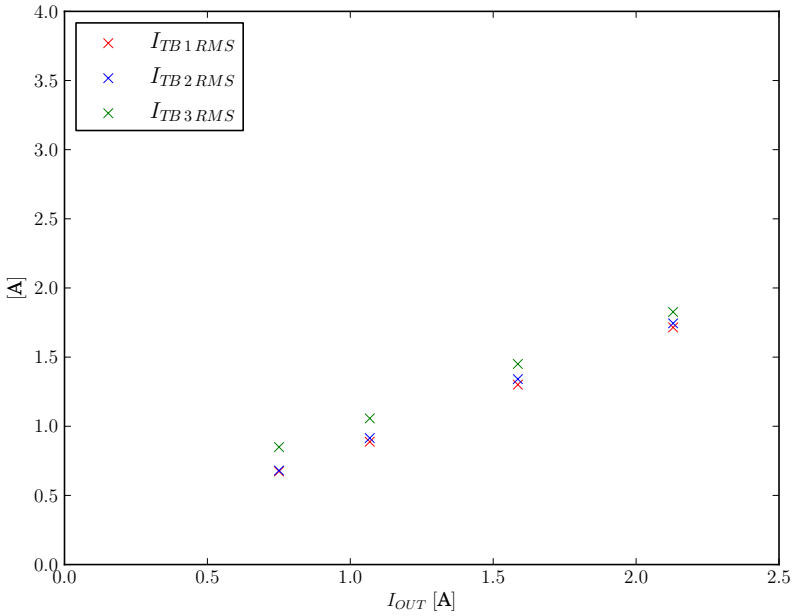
6.2 Efektivne vrednosti struja



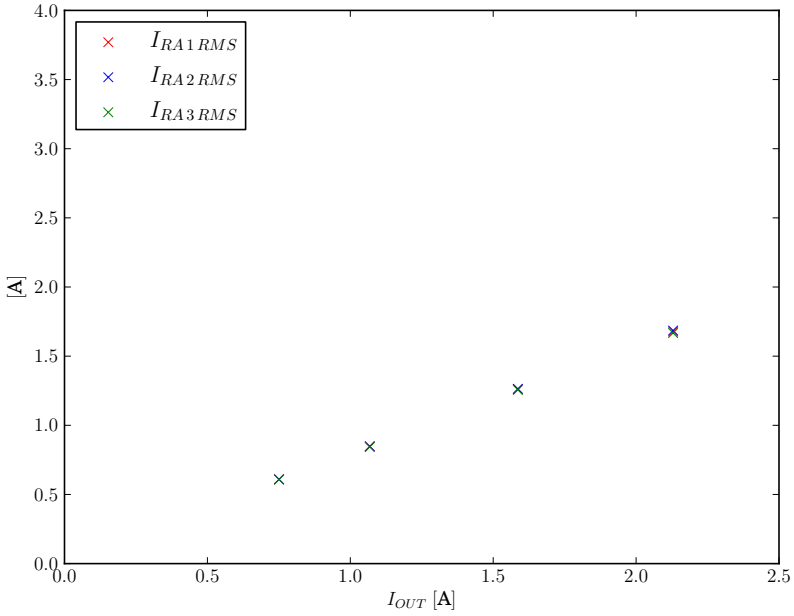
Slika 56: Efektivne vrednosti ulaznih struja.



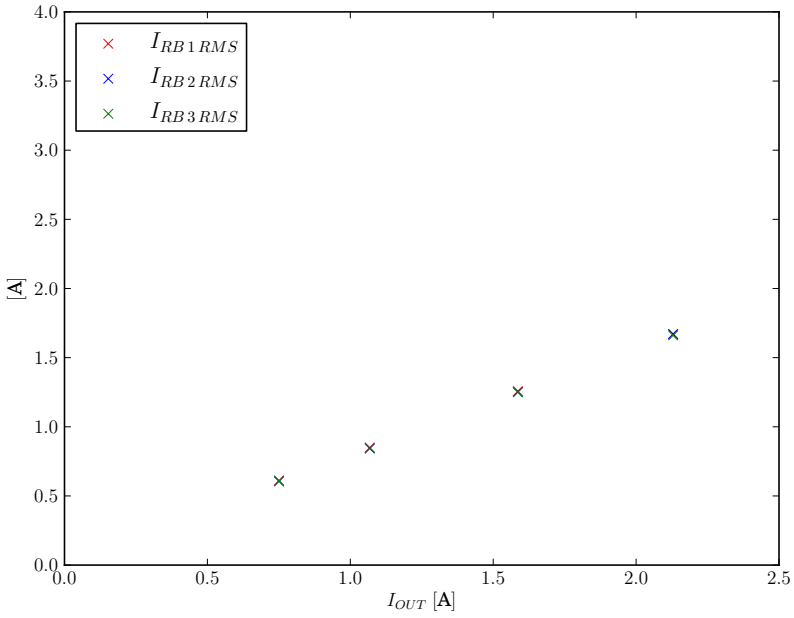
Slika 57: Efektivne vrednosti ulaznih struja transformatora A.



Slika 58: Efektivne vrednosti ulaznih struja transformatora B.

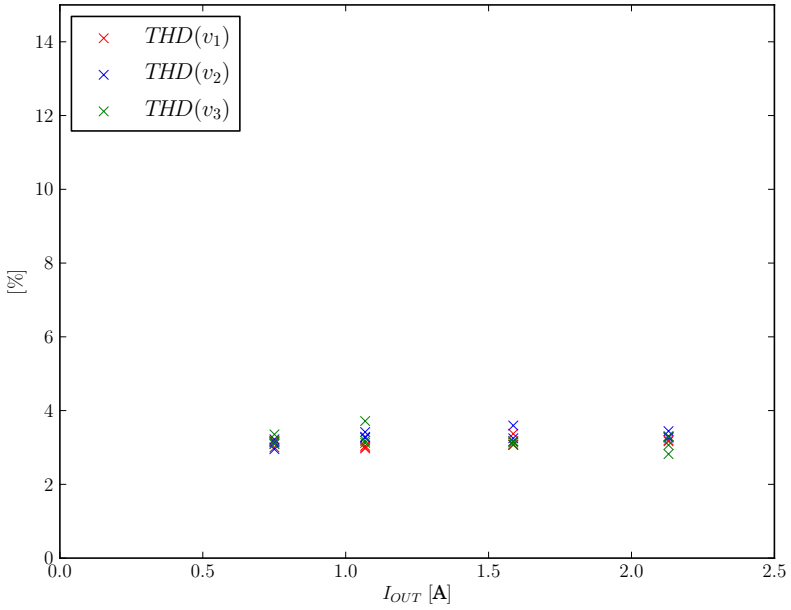


Slika 59: Efektivne vrednosti ulaznih struja ispravljača A.

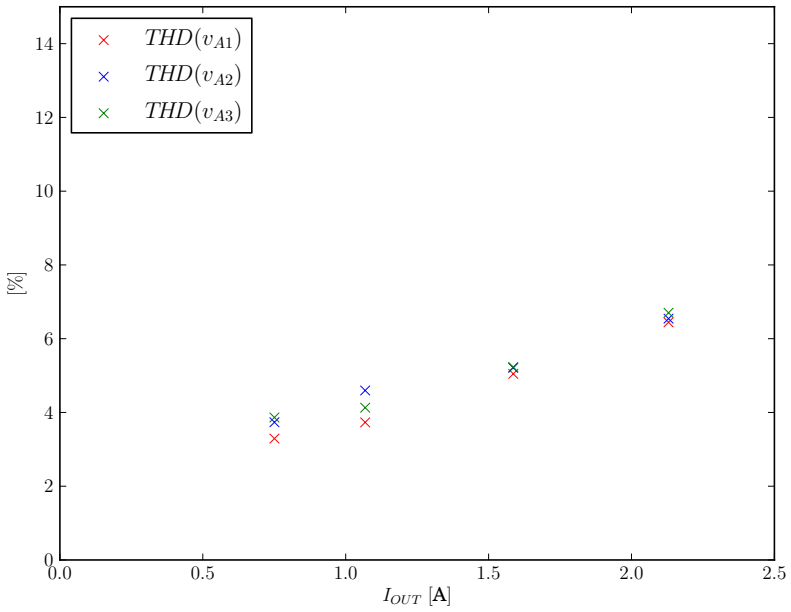


Slika 60: Efektivne vrednosti ulaznih struja ispravljača B.

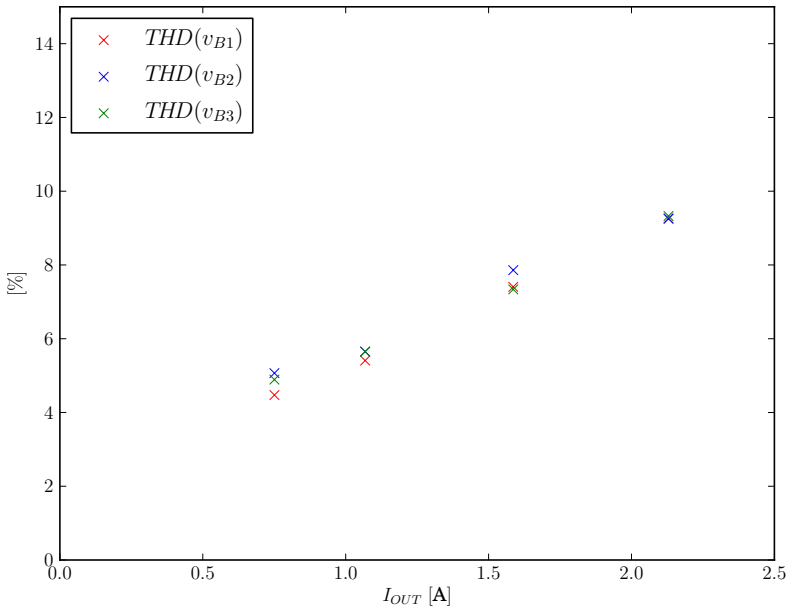
6.3 Izobličenja napona



Slika 61: Izobličenja ulaznih napona.

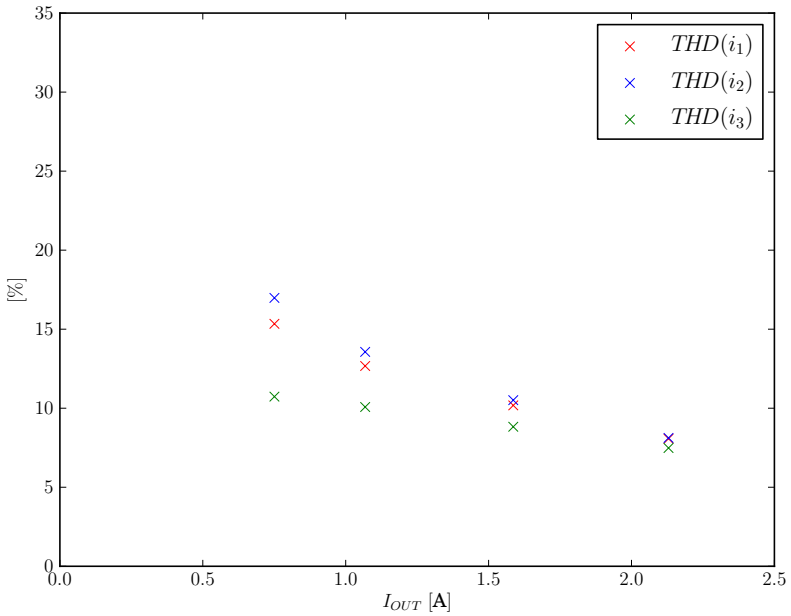


Slika 62: Izobličenja izlaznih napona transformatora A.

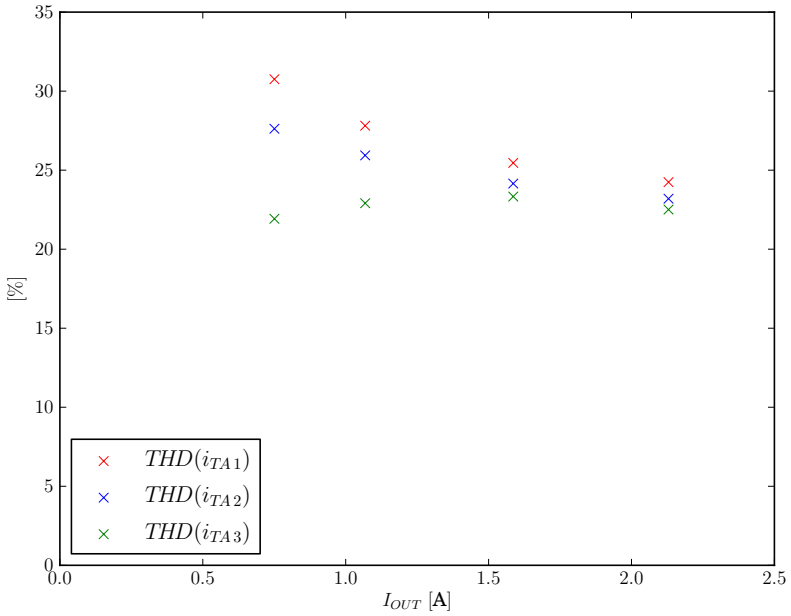


Slika 63: Izobličenja izlaznih napona transformatora B.

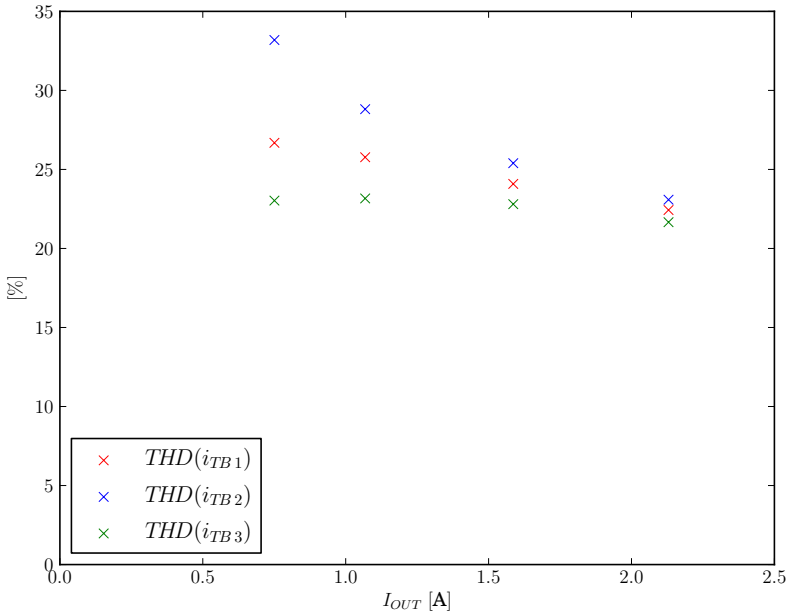
6.4 Izobličenja struja



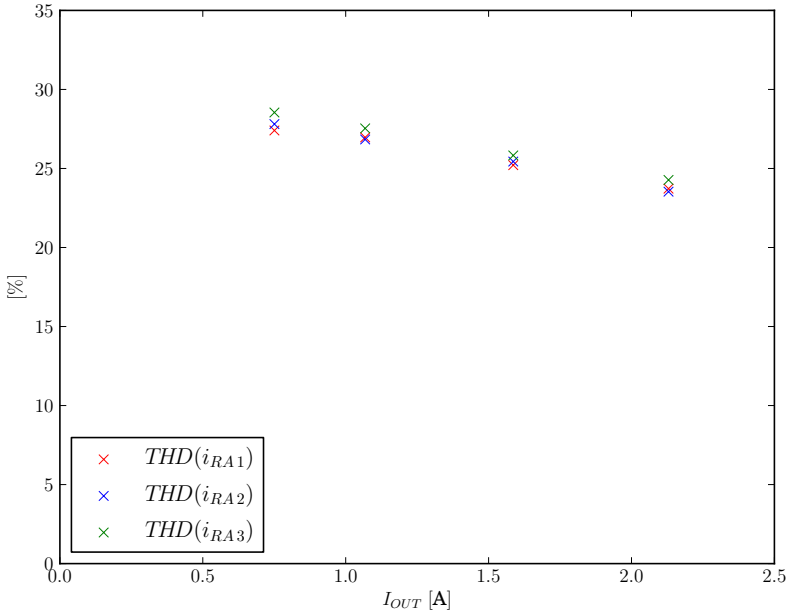
Slika 64: Izobličenja ulaznih struja.



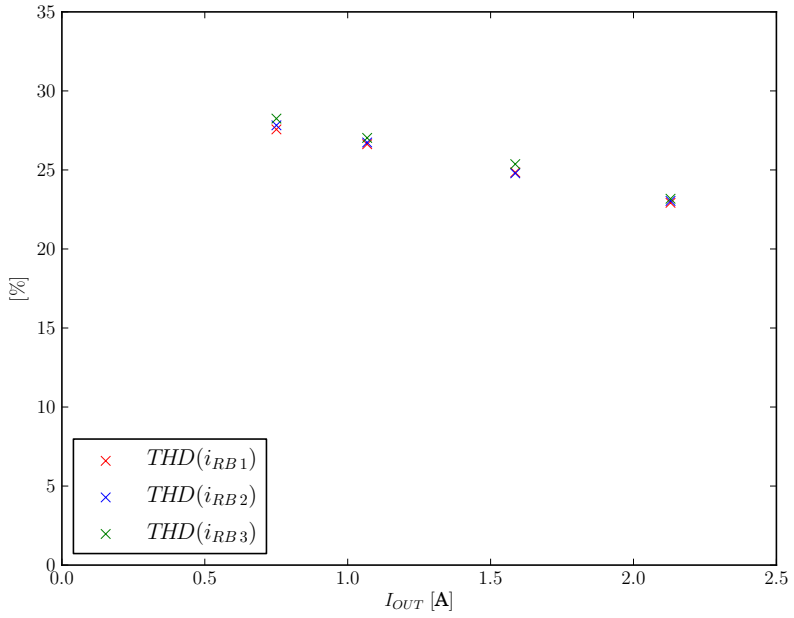
Slika 65: Izobličenja ulaznih struja transformatora A.



Slika 66: Izobličenja ulaznih struja transformatora B.

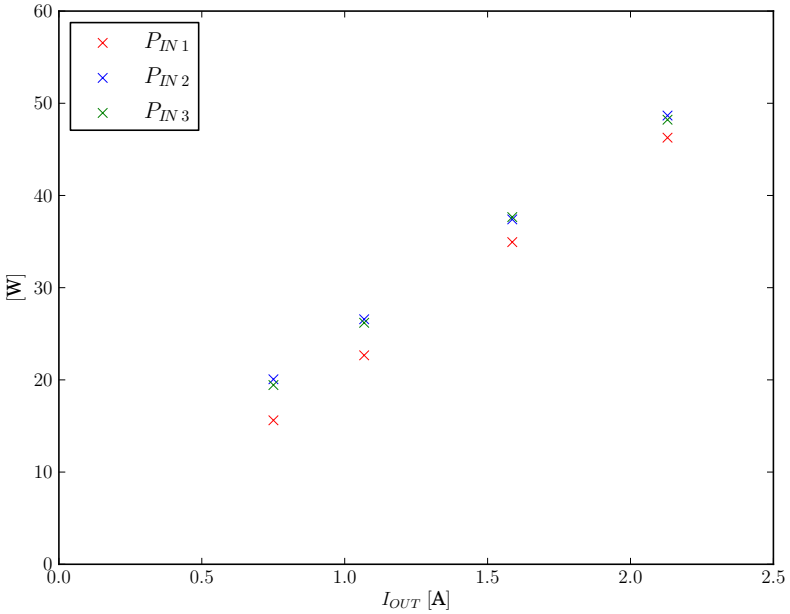


Slika 67: Izobličenja ulaznih struja ispravljača A.

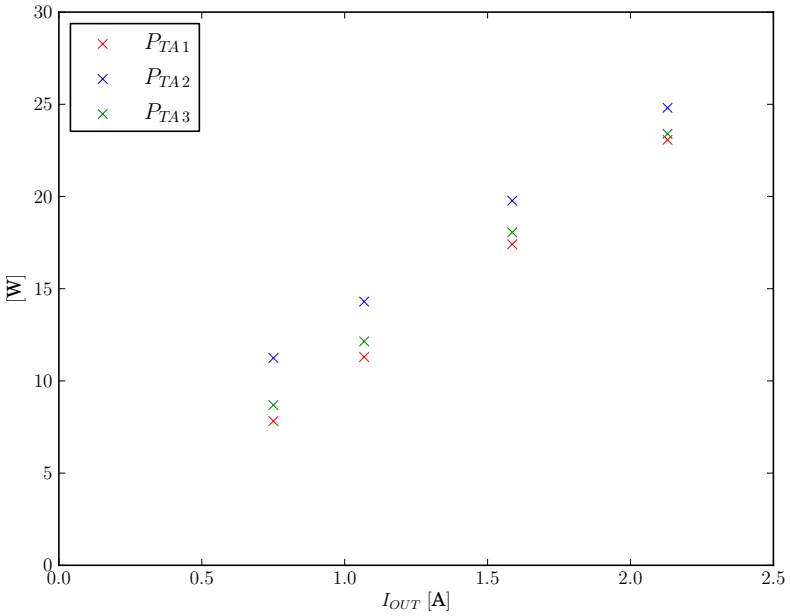


Slika 68: Izobličenja ulaznih struja ispravljača B.

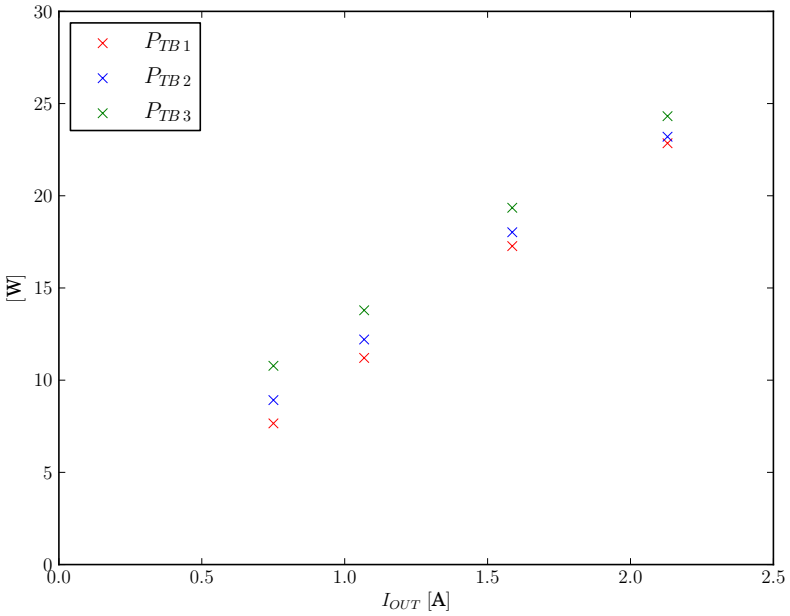
6.5 Aktivne snage



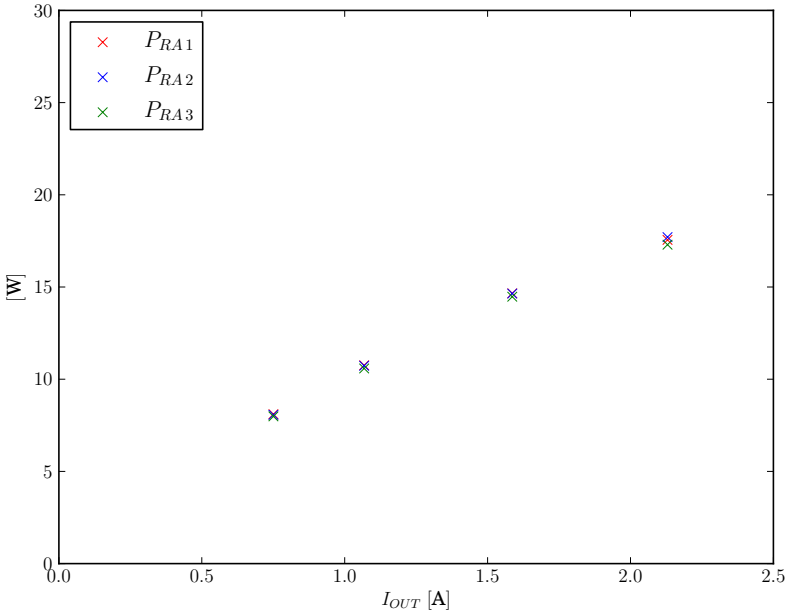
Slika 69: Aktivne snage, ulaz.



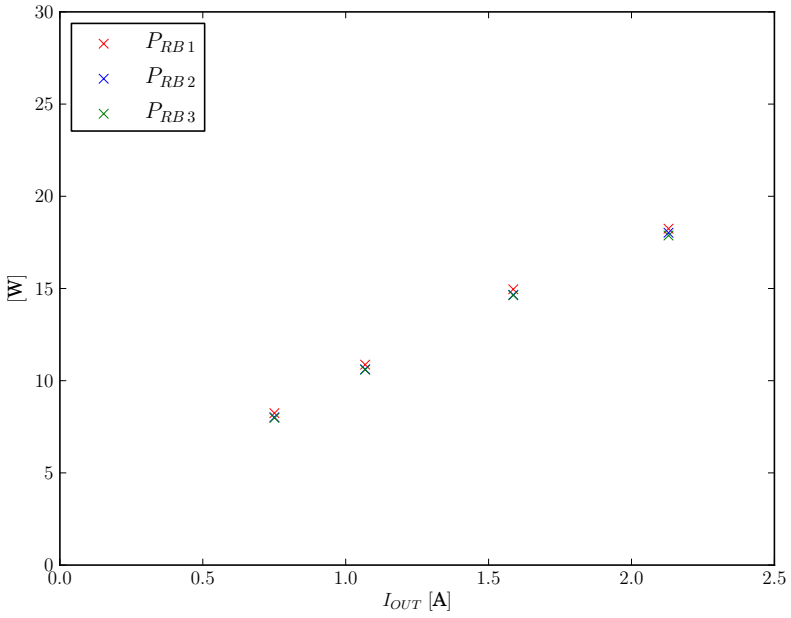
Slika 70: Aktivne snage, ulaz transformatora A.



Slika 71: Aktivne snage, ulaz transformatora B.

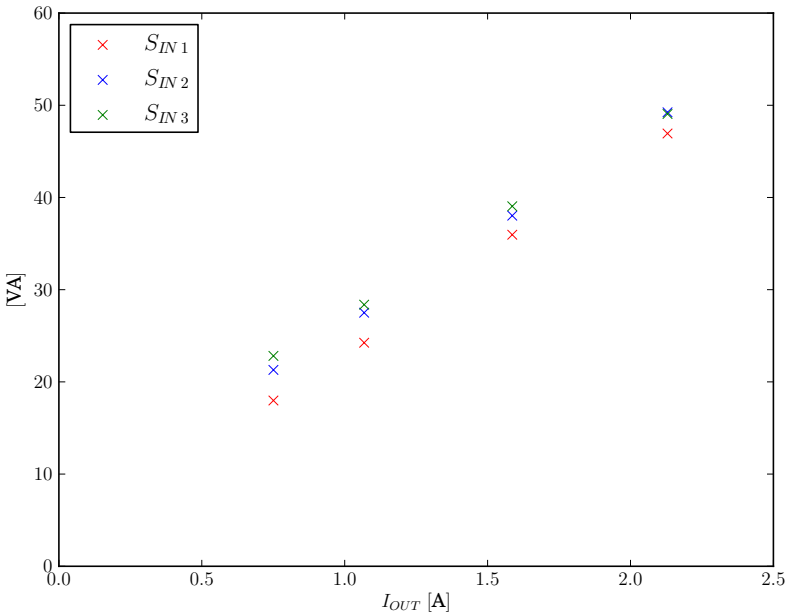


Slika 72: Aktivne snage, ulaz ispravljača A.

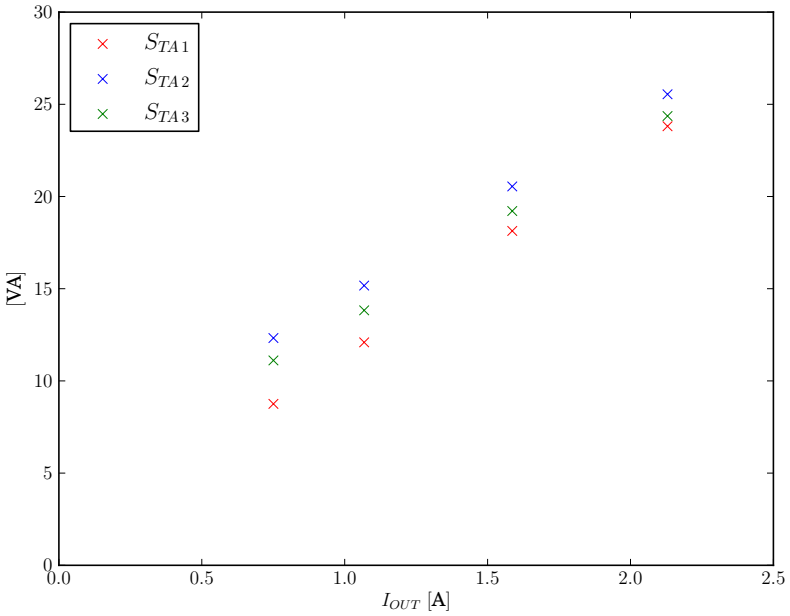


Slika 73: Aktivne snage, ulaz ispravljača B.

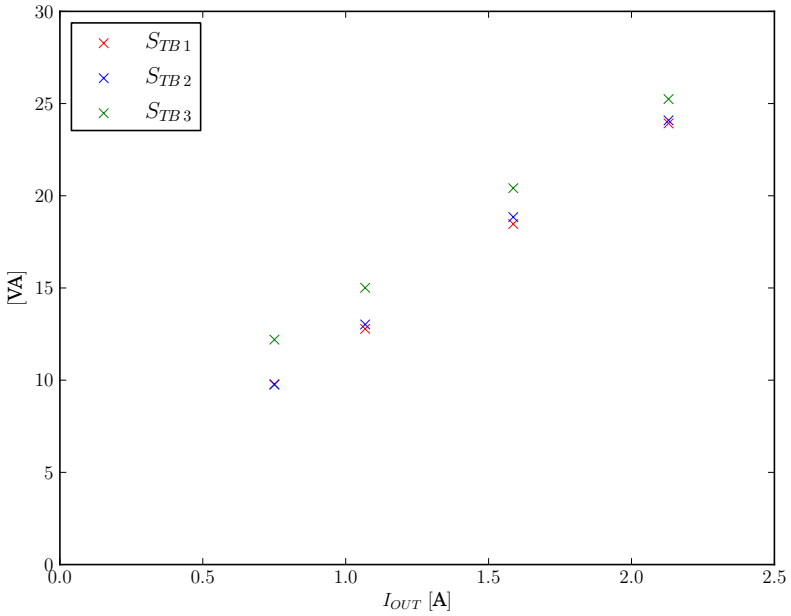
6.6 Prividne snage



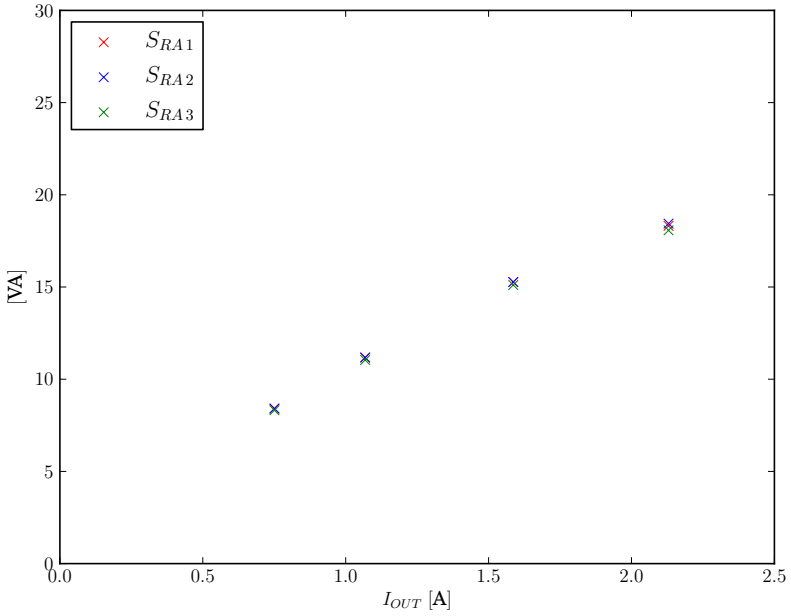
Slika 74: Prividne snage, ulaz.



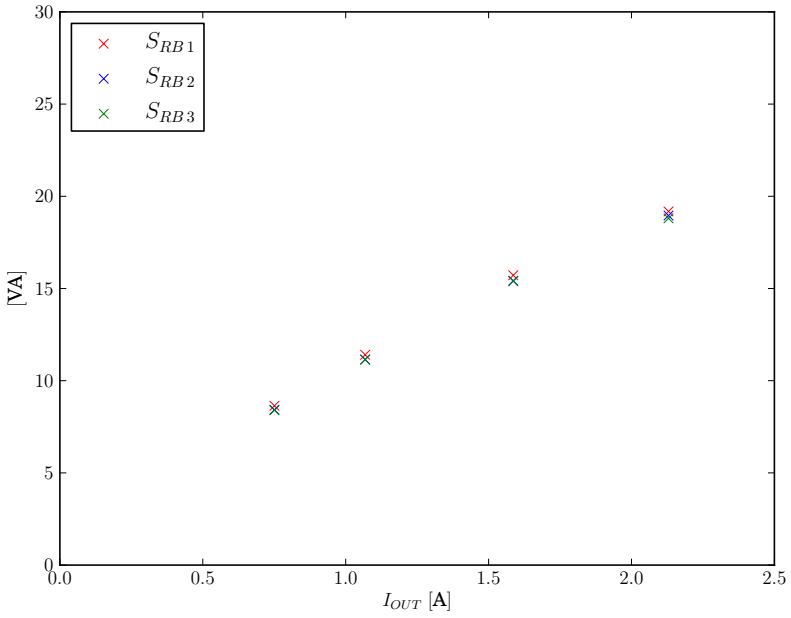
Slika 75: Prividne snage, ulaz transformatora A.



Slika 76: Prividne snage, ulaz transformatora B.

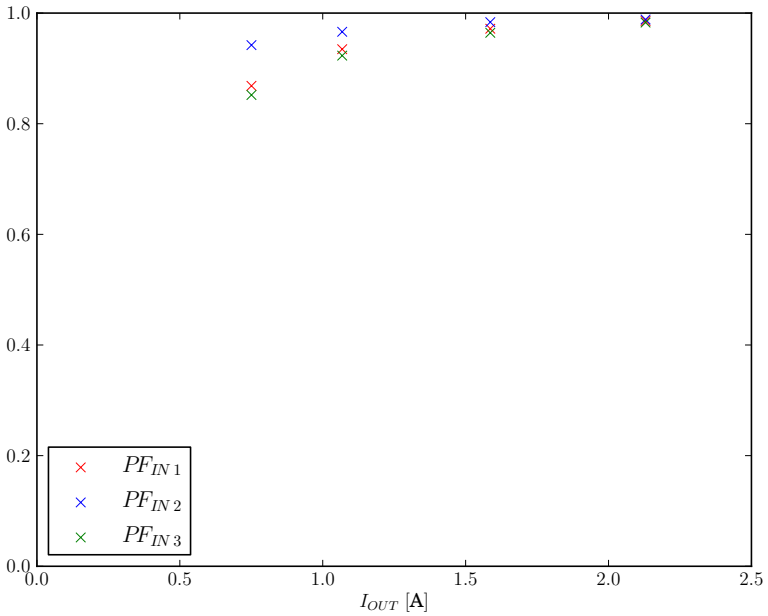


Slika 77: Prividne snage, ulaz ispravljača A.

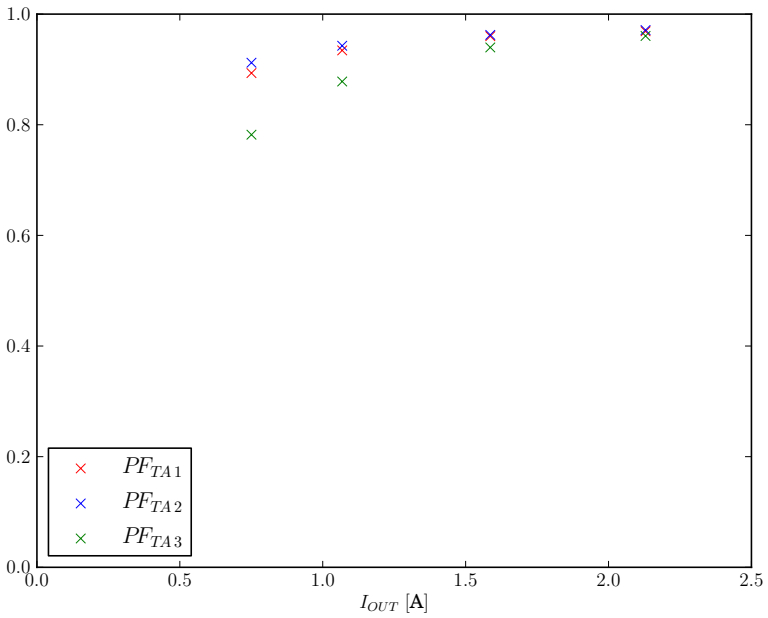


Slika 78: Prividne snage, ulaz ispravljača B.

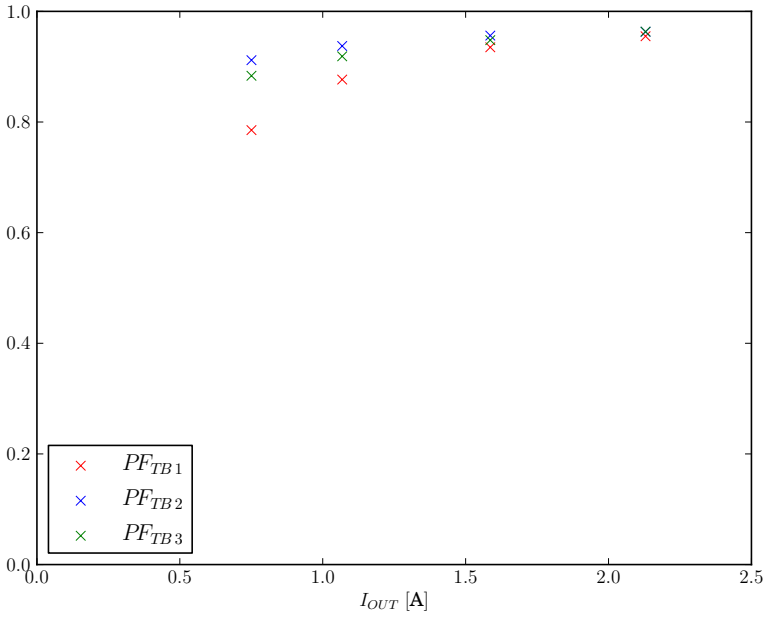
6.7 Faktori snage



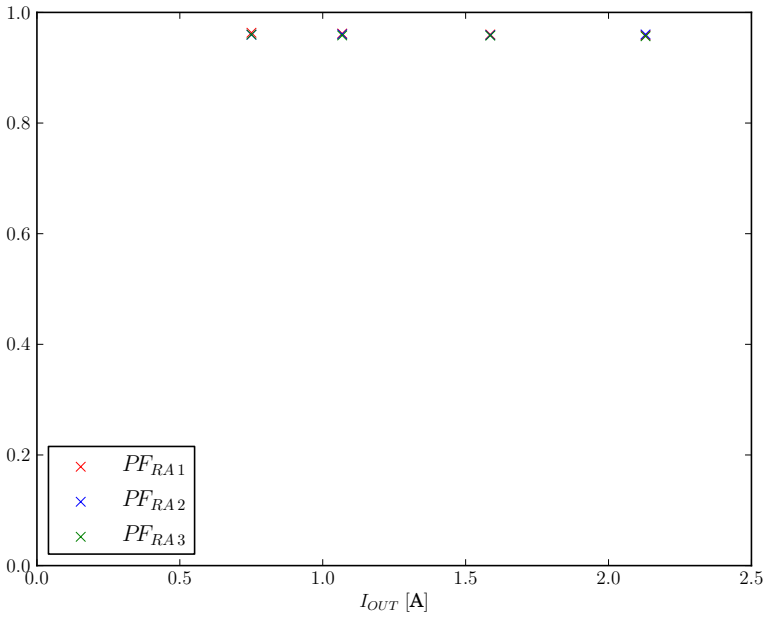
Slika 79: Faktori snage, ulaz.



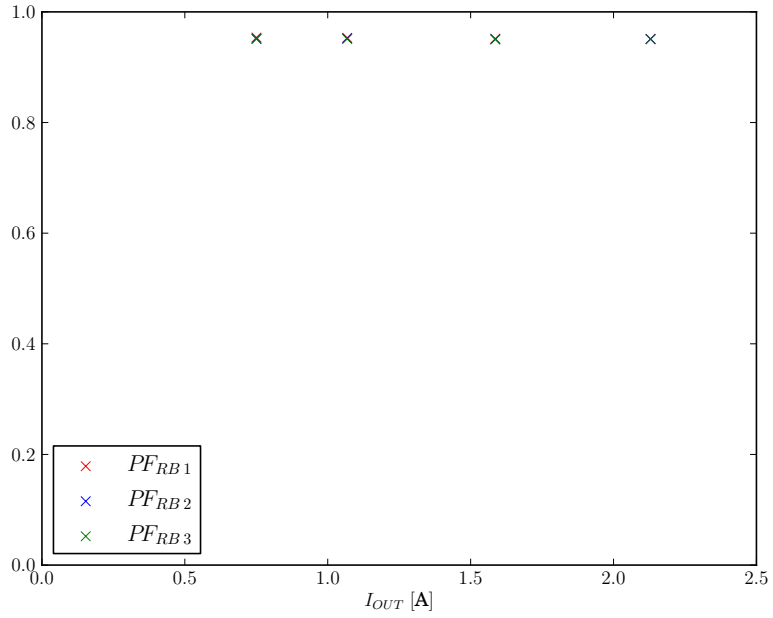
Slika 80: Faktori snage, ulaz transformatora A.



Slika 81: Faktori snage, ulaz transformatora B.

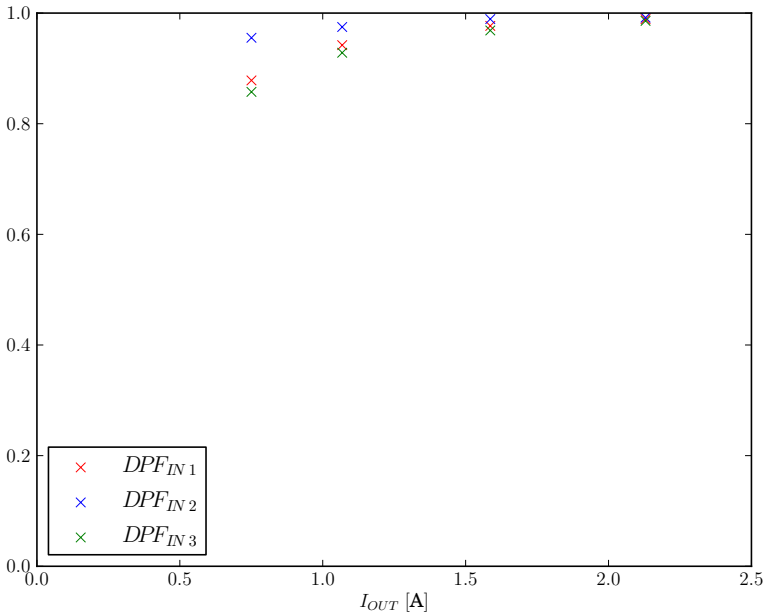


Slika 82: Faktori snage, ulaz ispravljača A.

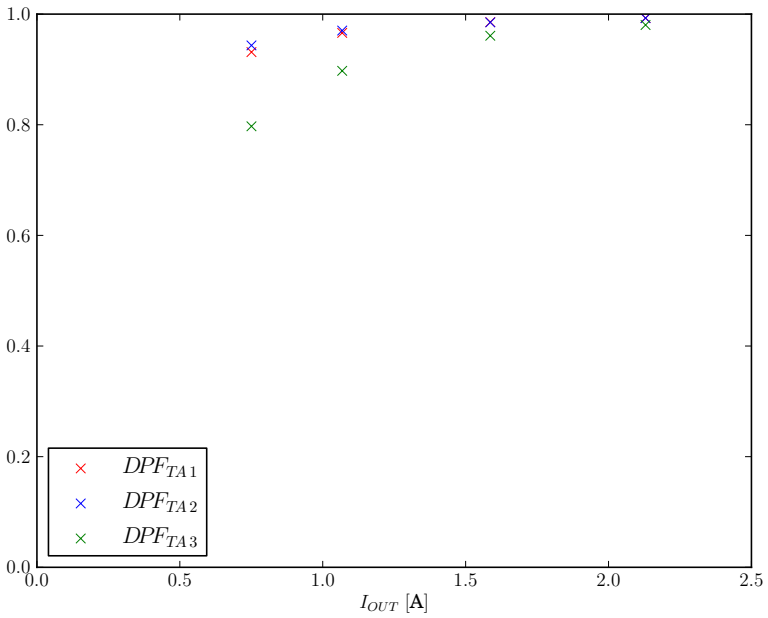


Slika 83: Faktori snage, ulaz ispravljača B.

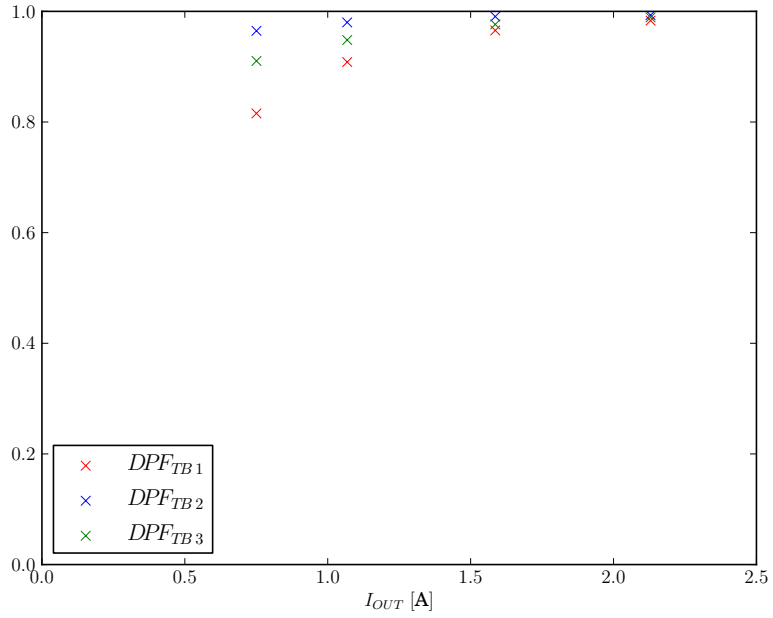
6.8 Displacement Power Factors



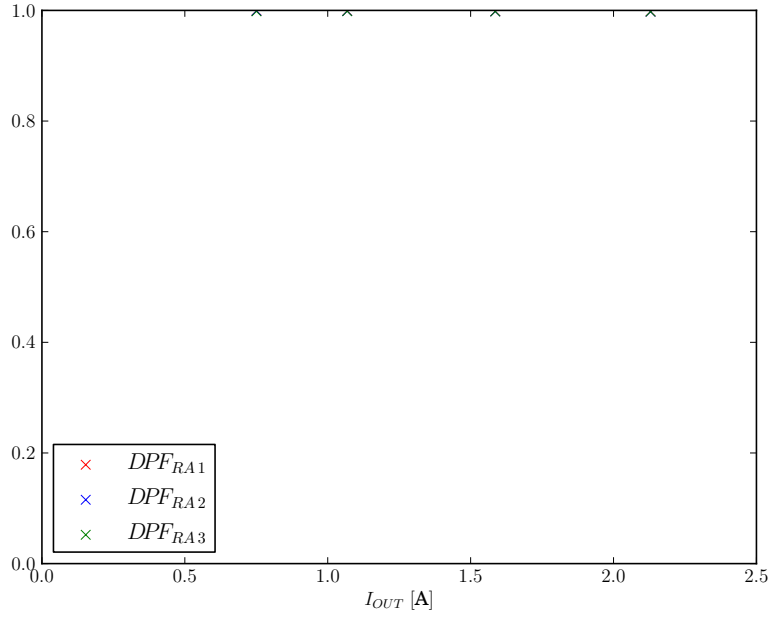
Slika 84: Displacement power factors, ulaz.



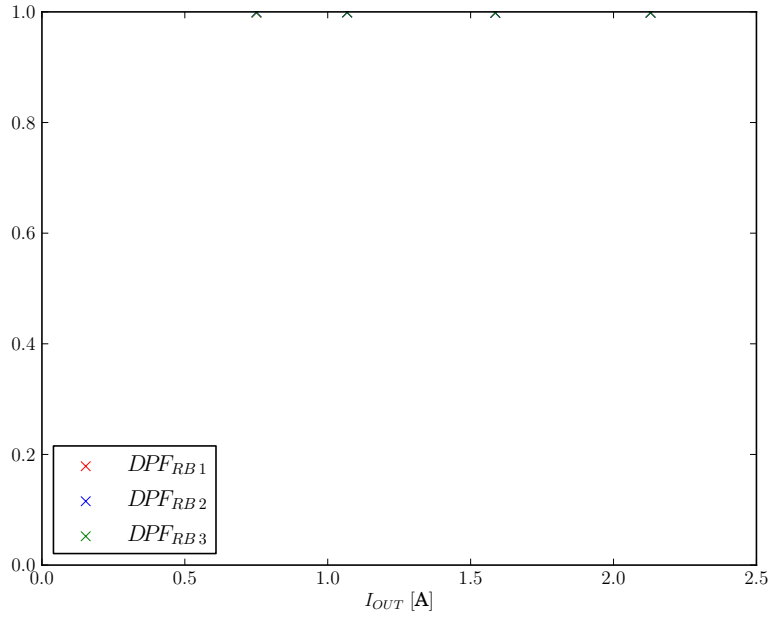
Slika 85: Displacement power factors, ulaz transformatora A.



Slika 86: Displacement power factors, ulaz transformatora B.

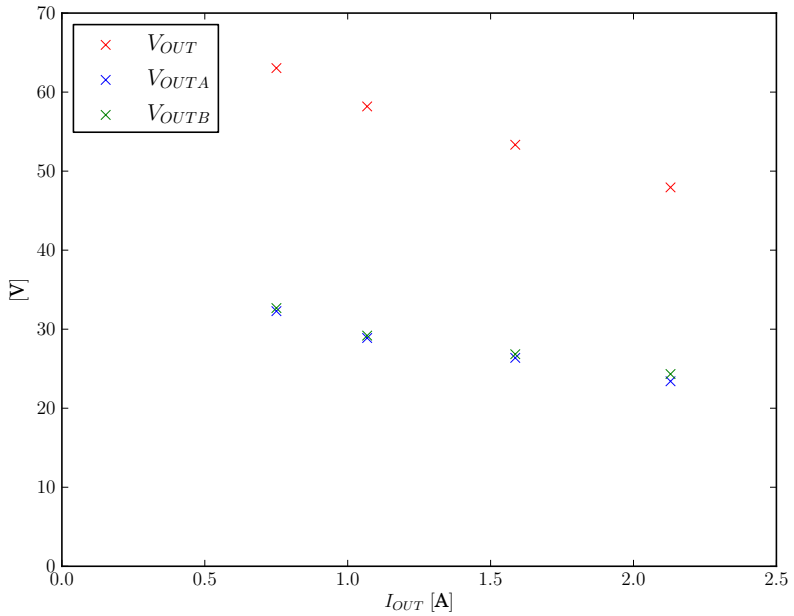


Slika 87: Displacement power factors, ulaz ispravljača A.

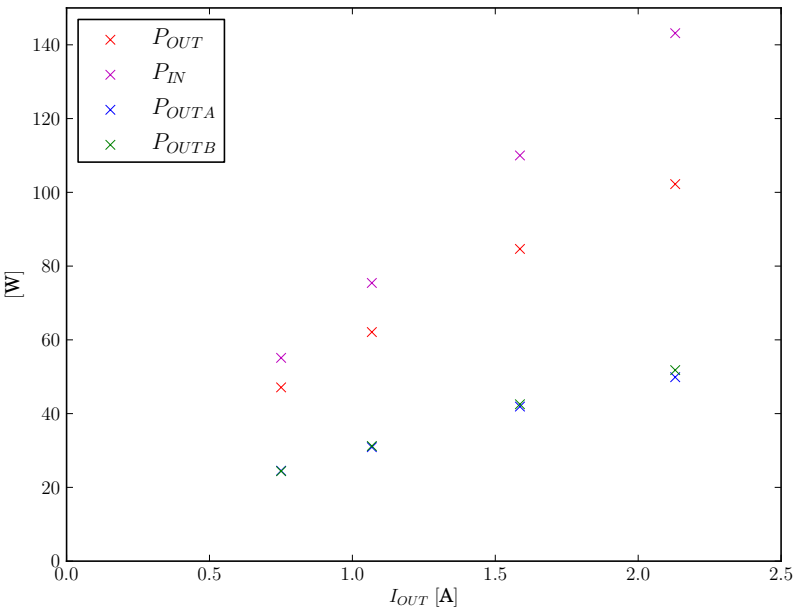


Slika 88: Displacement power factors, ulaz ispravljača B.

6.9 Izlaz ispravljača

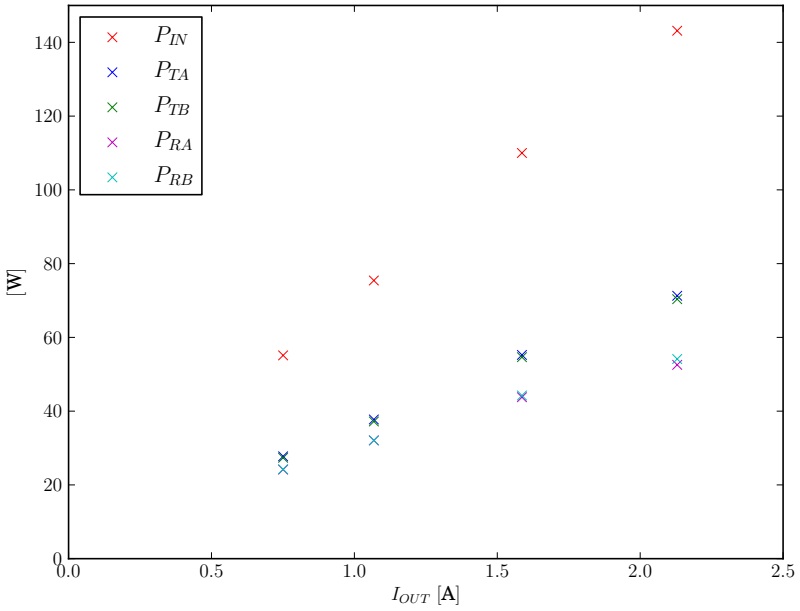


Slika 89: Izlazni naponi.

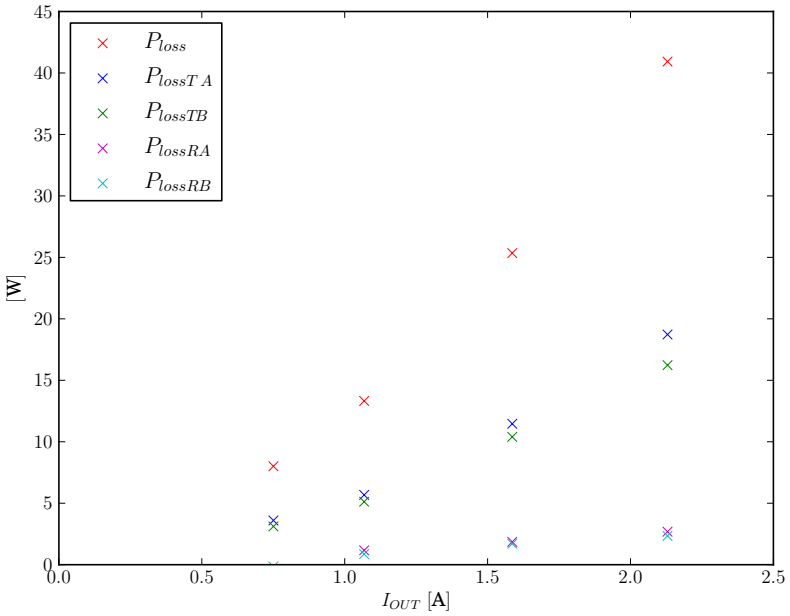


Slika 90: Izlazne snage.

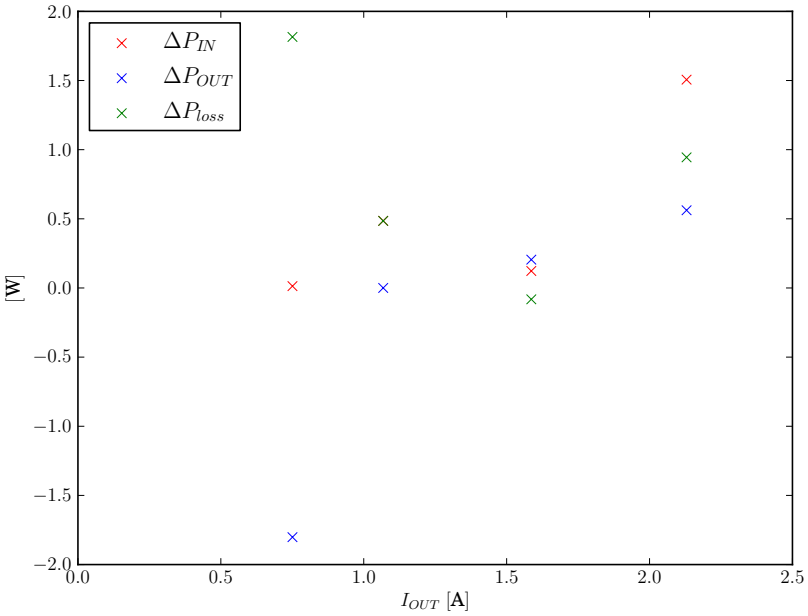
6.10 Rezultati obrade



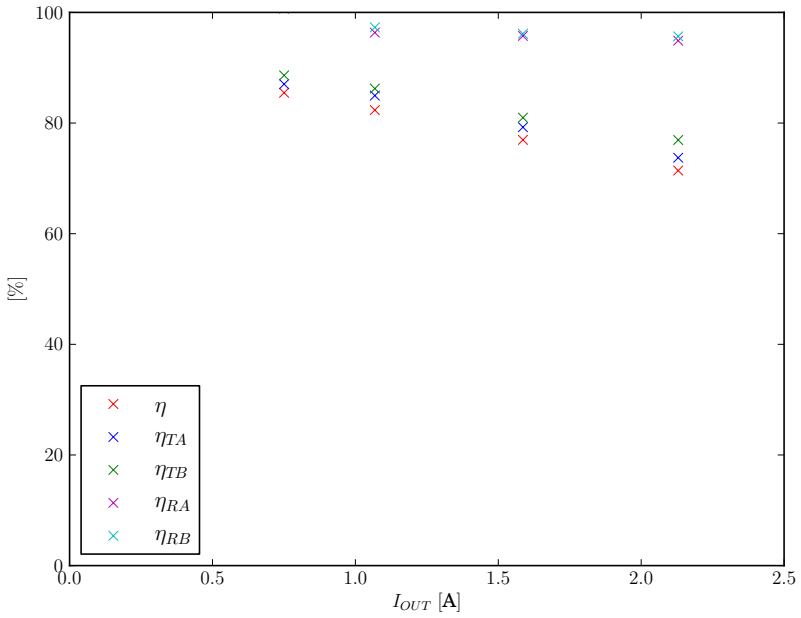
Slika 91: Trofazne snage na ulazima.



Slika 92: Snage gubitaka.



Slika 93: Bilans snage.



Slika 94: Koeficijenti korisnog dejstva.

6.11 Tevenenovi ekvivalenti na izlazu

$E_T = 70.37\,\mathrm{V}$

$R_T = 10.65\,\Omega$

$E_{TA} = 36.24\,\mathrm{V}$

$R_{TA} = 6.15\,\Omega$

$E_{TB} = 36.21\,\mathrm{V}$

$R_{TB} = 5.75\,\Omega$