PÉCSI TUDOMÁNYEGYETEM
UNIVERSITY OF PÉCS

University of Pecs
Faculty of Engineering and Information Technology

Measurement and Data Acquisition Homework 1
Calibration+statistical signal processing

The task is according to the attached table.
The report shall include two measurements (calculations):

1. Calibration;
2. Evaluation of Test series.

Rhe following points must be included for the homework:

1. First cover page (name, year, university, faculty, degree program, date, who carried out the measurement (if several students are working together).
2. General Information
test site (building, room)
time/date of the measurement
responsible for the measurement (name):

1. Calibration

- The purpose measurement
- description of measurement
- relationships for evaluation (required for all relationships, which can be defined here.)
- Table of measured values (Note: The column headers must include the units!).
- absolute (H) and relative (h) error of the internal points
- class (accuracy) (Beta)
- a graph with the calibtared points. The calibration must be done according to the two-point calibration method.
- The calibration points are defined in the tables at the end of the document
- In addition, you must include: calibration equation (the calculated values of **slope** and **interception**) SPAN values the measurement range.

2. Evaluation of Test series

- The purpose measurement
- description of measurement
- relationships for evaluation (each relation must be defined) .

  The following interval estimation should be done $(\bar{x} \pm \frac{L1}{L2})$:
  - Interval estimation,
  - deviation,
  - The mean of abolute errors,
  - probable error.
- Probability for the $\bar{x} \pm k * s$ intervals, where k=1,2 and s is the deviation.

Good work!

Adam Schiffer, PhD

DATA SERIES

a	b	c	d	e	f	g	h	i	j	k	l
U(V)	R(Ohm)	i(mA)	U(V)	R(Ohm)	i(mA)	R(Ohm)	U(V)	i(A)	T(˚C)	T(˚C)	m(kg)
61,87	108,05	36,87	408,51	108,03	108,32	100,17	78,16	74,29	73,32	183,44	108,02
60,45	108,03	36,01	414,39	108,76	115,21	101,88	74,78	75,20	73,99	183,44	108,18
60,90	108,43	36,08	413,43	108,95	115,89	100,82	73,04	73,36	72,26	183,28	108,40
60,43	108,11	36,10	415,62	108,48	117,62	100,35	73,75	73,01	72,96	183,29	108,11
61,11	108,17	36,56	402,88	108,92	109,51	100,22	74,13	74,96	72,30	183,36	108,26
60,42	108,30	36,06	396,40	108,37	116,51	101,87	73,89	72,74	73,58	183,40	108,07
60,02	108,03	36,18	406,18	108,12	117,49	101,22	78,77	72,97	73,36	183,26	108,09
61,73	108,30	36,74	411,22	108,26	110,49	101,62	76,47	73,44	73,31	183,07	108,05
60,01	108,74	36,24	414,42	108,30	108,99	101,92	76,63	72,10	72,07	183,25	108,13
60,75	108,21	36,14	399,78	108,51	112,47	101,72	79,54	73,63	72,43	183,20	108,00
60,24	109,20	36,26	405,90	108,57	108,54	101,67	79,96	75,27	73,10	183,49	108,44
60,36	108,14	36,68	407,79	108,27	115,20	100,71	79,98	72,29	72,20	183,03	108,04
60,27	108,49	36,43	414,18	108,90	115,42	101,92	77,38	72,49	72,44	183,47	108,16
60,46	108,21	36,30	401,64	108,60	111,38	100,30	79,10	72,66	73,96	183,12	108,02

CALIBRATION DATA

a		b		c		d		e		f	
P(Bar)	I (mA)	P(Bar)	u (V)	T (°C)	u (mV)	m (kg)	R (Ohm)	P(Bar)	I (mA)	P(Bar)	u (V)
3,2	6,444	3,0	3,640	2,2	77,440	2,2	70,400	4,0	7,820	3,0	1,660
4,4	7,476	4,0	5,400	2,4	89,760	2,4	81,600	6,0	15,080	4,0	2,540
5,6	8,796	5,0	7,600	2,6	102,960	2,6	93,600	8,0	24,980	5,0	3,640
6,8	10,404	6,0	10,240	2,8	117,040	2,8	106,400	10,0	37,520	6,0	4,960
8,0	12,300	7,0	13,320	3,0	132,000	3,0	120,000	12,0	52,700	7,0	6,500
9,2	14,484	8,0	16,840	3,2	147,840	3,2	134,400	14,0	70,520	8,0	8,260
10,4	16,956	9,0	20,800	3,4	164,560	3,4	149,600	16,0	90,980	9,0	10,240
11,6	19,716	10,0	25,200	3,6	182,160	3,6	165,600	18,0	114,080	10,0	12,440
12,8	22,764	11,0	30,040	3,8	200,640	3,8	182,400	20,0	139,820	11,0	14,860
14,0	26,100	12,0	35,320	4,0	220,000	4,0	200,000	22,0	168,200	12,0	17,500
15,2	29,724	13,0	41,040	4,2	240,240	4,2	218,400	24,0	199,220	13,0	20,360
16,4	33,636	14,0	47,200	4,4	261,360	4,4	237,600	26,0	232,880	14,0	23,440
17,6	37,836	15,0	53,800	4,6	283,360	4,6	257,600	28,0	269,180	15,0	26,740
18,8	42,324	16,0	60,840	4,8	306,240	4,8	278,400	30,0	308,120	16,0	30,260
20,0	47,100	17,0	68,320	5,0	330,000	5,0	300,000	32,0	349,700	17,0	34,000
21,2	52,164	18,0	76,240	5,2	354,640	5,2	322,400	34,0	393,920	18,0	37,960
22,4	57,516	19,0	84,600	5,4	380,160	5,4	345,600	36,0	440,780	19,0	42,140
23,6	63,156	20,0	93,400	5,6	406,560	5,6	369,600	38,0	490,280	20,0	46,540
24,8	69,084	21,0	102,640	5,8	433,840	5,8	394,400	40,0	542,420	21,0	51,160
26,0	75,300	22,0	112,320	6,0	462,000	6,0	420,000	42,0	597,200	22,0	56,000

g		h		i		j		k		l	
T (°C)	u (mV)	m (kg)	R (Ohm)	P(Bar)	I (mA)	P(Bar)	u (V)	T (°C)	u (mV)	m (kg)	R (Ohm)
2,3	4,074	2,7	15,355	2,2	5,359	3,1	11,842	3,4	9,400	3,8	2,069
2,7	4,944	3,3	17,888	2,4	5,770	4,2	18,962	4,9	16,782	5,5	4,059
3,0	5,909	4,0	20,901	2,7	6,213	5,3	27,979	6,3	26,444	7,3	6,731
3,3	6,971	4,6	24,393	2,9	6,688	6,4	38,893	7,8	38,388	9,0	10,084
3,7	8,128	5,3	28,365	3,1	7,194	7,6	51,705	9,2	52,612	10,8	14,118
4,0	9,381	6,0	32,815	3,3	7,733	8,7	66,415	10,6	69,117	12,6	18,834
4,3	10,730	6,6	37,744	3,5	8,304	9,8	83,022	12,1	87,904	14,3	24,232
4,6	12,175	7,3	43,153	3,8	8,906	10,9	101,526	13,5	108,971	16,1	30,311
5,0	13,715	7,9	49,041	4,0	9,541	12,0	121,928	15,0	132,319	17,8	37,072
5,3	15,352	8,6	55,408	4,2	10,207	13,1	144,227	16,4	157,948	19,6	44,514
5,6	17,084	9,3	62,254	4,4	10,906	14,2	168,423	17,8	185,858	21,4	52,637
6,0	18,912	9,9	69,580	4,6	11,636	15,3	194,517	19,3	216,049	23,1	61,442
6,3	20,836	10,6	77,384	4,9	12,398	16,4	222,509	20,7	248,521	24,9	70,928
6,6	22,856	11,2	85,668	5,1	13,193	17,5	252,398	22,2	283,274	26,6	81,096
7,0	24,971	11,9	94,431	5,3	14,019	18,7	284,184	23,6	320,308	28,4	91,946
7,3	27,182	12,6	103,672	5,5	14,877	19,8	317,868	25,0	359,623	30,2	103,476
7,6	29,490	13,2	113,394	5,7	15,767	20,9	353,449	26,5	401,219	31,9	115,689
7,9	31,893	13,9	123,594	6,0	16,689	22,0	390,927	27,9	445,096	33,7	128,582
8,3	34,392	14,5	134,273	6,2	17,643	23,1	430,303	29,4	491,253	35,4	142,158
8,6	36,986	15,2	145,432	6,4	18,629	24,2	471,577	30,8	539,692	37,2	156,414
8,9	39,677	15,9	157,070	6,6	19,647	25,3	514,748	32,2	590,412	39,0	171,353

TASK:

	NEPTUN ID	CALIBRATION	DATA SERIE
1	J4SV2S	a	a
2	S5GGGJ	k	e
3	YO163Q	b	c
4	EFD4C9	c	b
5	IBJNUG	d	i
6	AUU4NA	e	h
7	BVQYMZ	f	f
8	MYRGIP	g	d
9	KFOHLK	h	g
10		i	k
11		j	j
12		k	l
13		l	a
14		a	e
15		k	c
16		b	b
17		c	i
18		d	h
19		e	f
20		f	d