Vibraimage statistical analysis software

VibraStat

Manual

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CONTENT

1. Basic applications

The **TPStat.exe** program is intended for statistical processing of VibraImage program results and increase the accuracy of person or people group psychophysiological status measurement based on vibraimage technology.

Program application goal is finding of statistically proved differences in vibraimage parameters between two groups of measurements and visualization of research results. Statistical significant difference presence in vibraimage parameters means biological, psychological or physiological changes, taken place for corresponding groups. The program applies in medicine, psychology, psychophysiology, biology, sociology, sports, and various scientific researches where necessary to reliable defining psychophysiolgical status of the person.

2. Processing data

The initial data for the program are the ***_measurement.xml files which are created by VibraImage program. The program analyzing parameters changes between two groups of comparison. For each group of comparison («Group 1» and «Group 2») it is necessary to create the catalogue on a disk in which folders or files with the parameters received at measurement in an **M** mode of Vibraimage program are copied. Folders of groups on a disk are sorted and numbered by alphabetically.

Statistical processing is based on the analysis of the M (vibraimage parameter expected value (mean)), the S (vibraimage parameter standard deviation) and variability V (V=S/M) for the following psychophysiological parameters of the person measured in **M** mode by VibraImage PRO program:

T1 – Aggression parameter (P7);

T2 – Stress parameter (P6);

T3 – Tension/Anxiety parameter (F5X);

T4 – Suspect parameter (P19);

T5 – Balance parameter (P16);

T6 – Charm parameter (P17);

T7 – Energy parameter (P8);

T8 – Self regulation parameter (P18);

T9 – Inhibition parameter (F6);

T10 – Neuroticism parameter (F9).

3. Operating procedure

1. Copy VibraStat.zip file with stat.xls and TPStat.exe on a hard disk of the computer from the link http://www.psymaker.com/downloads/VibraStat.zip . The file stat.xls will change after processing, so it is preferable to save initial stat.exe file with the other name as Defaultstat.xls as reserved copy in the other directory.

2. Copy file stat.xls and file TPStat.exe in a NEW directory on the hard disk where you will do processing of results. For example, named this directory TEST.

3. On the said directory (TEST) computer create 2 catalogues. Catalogues are sorted and numbered on a disk by alphabetically. The first catalogue is intended for initial measurements of patients (group 1), the second - for the next measurements of parameters (group 2). As a result of program work the comparison of parameters of « groups 1 » and « groups 2 » patients will be made. The user can choose the name of catalogues any way, for example, the first catalogue it is possible to name Norma, the second - Pathology or, for example, Pleasure and Stress, depending on spent experiments.

4. In the specified catalogues copy subcatalogues with results of parameters measurements of separate people, having shared them on corresponding groups or simply results of M measurements of vibraimage program.

5. Run TPStat.exe.

6. As a result of the program work in a stat.xls file will be generated results of parameters comparison of two groups of people.

4. Program results

Results of program operation are formed in a stat.xls file.

Note, viewing of a stat.xls file is made by program Microsoft Excel from **not Russified** Microsoft Office package.

The file contains the following sheets:

Sheet User - contains the following information:

- GR - the name of two catalogues (two groups)
- User - a name of the patient
- BD - date of a birth
- SD - date of creation of a patient folder
- File - a name of a ***_measurement.xml file with results of measurements
- Path - a path to results ***_measurement.xml file

M sheet - is resulted calculation of M (the center of weights of frequency distribution) for all parameters T1-T10. The number of lines in the table corresponds to number of ***_measurement.xml files found in subdirectories «Groups 1» and «Groups 2». If parameter Pass=1 than the selected table line concerns to Group 1. If Pass=0 - to Group 2.

gr	user	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	Pass
VibraStat	Alergy	38	33,6	37,9	36,4	75,1	70,3	21,2	73,2	13,8	22,3	1
VibraStat	Alergy	47	20,9	12,6	27,5	58,2	79,1	32,5	68,3	20,2	74,4	1
Mammae	Назарова В Г	46,7	45	36,8	42,4	71,5	28,1	19,2	49,6	13,4	14	0
Mammae	Назарова В Г	33,5	35,2	40,6	38	71,6	23,1	14,1	48,1	13,7	18,9	0
Mammae	Мессерман Е Я	52,8	27,4	34,1	37,7	66,9	82,3	18,1	74,4	13,3	12,7	0
Mammae	Мессерман Е Я	54,4	31,7	36,9	42,9	56,5	79,7	16,2	67,3	13,2	11,8	0
Mammae	Пронина В Н	43	29	27,6	33,3	73,8	72	28,1	72,5	20,1	33,6	0

Fig. 1. M Sheet

S Sheet - is resulted calculation of **σ**, S (root-mean-square deviation of frequency distribution) for all parameters T1-T10. The number of lines in the table corresponds to number of ***_measurement.xml files found in subdirectories «Groups 1» and «Groups 2». If parameter Pass=1 than the selected table line concerns to Group 1. If Pass=0 - to Group 2.

gr	user	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	Pass
VibraStat	Alergy	4,033	2,936	7,789	2,927	3,271	5,254	2,31	3,632	2,226	4,161	1
VibraStat	Alergy	6,539	1,874	8,971	3,807	12,16	2,73	11,269	6,991	7,441	15,717	1
Mammae	Назарова В Г	3,705	3,439	8,504	2,924	2,685	7,913	2,531	4,566	1,404	2,725	0
Mammae	Назарова В Г	10,15	5,957	7,364	4,829	4,503	21,819	3,524	10,614	1,894	3,916	0
Mammae	Мессерман Е Я	9,529	0,807	4,052	2,367	2,758	3,477	1,994	1,274	1,268	2,99	0
Mammae	Мессерман Е Я	17,267	1,464	3,453	12,207	9,042	7,428	2,094	2,47	1,179	2,335	0
Mammae	Пронина В Н	2,331	0,743	6,94	1,979	3,218	2,683	2,19	2,28	3,356	9,411	0

Fig. 2. S Sheet

V Sheet - is resulted calculation of variability (V = (σ / M) or the same V=(S/M)) for all parameters T1-T10. The number of lines in the table corresponds to number of ***_measurement.xml files found in subdirectories «Groups 1» and «Groups 2». If parameter Pass=1 than the selected table line concerns to Group 1. If Pass=0 - to Group 2.

gr	user	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	Pass
VibraStat	Alergy	10,6	8,7	20,6	8	4,4	7,5	10,9	5	16,1	18,7	1
VibraStat	Alergy	13,9	9	71,2	13,8	20,9	3,5	34,7	10,2	36,8	21,1	1
Mammae	Назарова В Г	7,93362	7,64222	23,1087	6,89623	3,75524	28,1601	13,1823	9,20565	10,4776	19,4643	0
Mammae	Назарова В Г	30,2985	16,9233	18,1379	12,7079	6,28911	94,4545	24,9929	22,0665	13,8248	20,7196	0
Mammae	Мессерман Е Я	18,0473	2,94526	11,8827	6,27851	4,12257	4,22479	11,0166	1,71237	9,53383	23,5433	0
Mammae	Мессерман Е Я	31,7408	4,6183	9,35772	28,4545	16,0035	9,31995	12,9259	3,67013	8,93182	19,7881	0
Mammae	Пронина В Н	5,42093	2,56207	25,1449	5,94294	4,36043	3,72639	7,79359	3,14483	16,6965	28,0089	0

Fig. 3. V Sheet

Stat Sheet - the generalized statistics for parameters of M, σ, V is resulted. If parameter Pass=0 the given parameter Ti takes part in calculations. If parameter Pass=1 parameter Ti is excluded from calculations.

var	M1 avg	S1 avg	V1 avg	M2 avg	S2 avg	V2 avg	Th M	Th S	Th P	w M	w S	w V	Pass
T1	42,5	5,286	12,25	46,08	8,5964	18,688	44,29	6,9412	15,469115	-0,078	-0,385	-0,345	0
T2	27,25	2,405	8,85	33,66	2,482	6,9382	30,455	2,4435	7,894115	-0,19	-0,031	0,216	0
T3	25,25	8,38	45,9	35,2	6,0626	17,526	30,225	7,2213	31,713192	-0,283	0,2765	0,6182	1
T4	31,95	3,367	10,9	38,86	4,8612	12,056	35,405	4,1141	11,478008	-0,178	-0,307	-0,096	0
T5	66,65	7,7155	12,65	68,06	4,4412	6,9062	67,355	6,07835	9,778085	-0,021	0,4244	0,4541	0
T6	74,7	3,992	5,5	57,04	8,664	27,977	65,87	6,328	16,738573	0,2364	-0,539	-0,803	1
T7	26,85	6,7895	22,8	19,14	2,4666	13,982	22,995	4,62805	18,391129	0,2872	0,6367	0,3867	0
T8	70,75	5,3115	7,6	62,38	4,2408	7,9599	66,565	4,77615	7,779948	0,1183	0,2016	-0,045	0
T9	17	4,8335	26,45	14,74	1,8202	11,893	15,87	3,32685	19,171455	0,1329	0,6234	0,5504	1
T10	48,35	9,939	19,9	18,2	4,2754	22,305	33,275	7,1072	21,10242	0,6236	0,5698	-0,108	0

Fig. 4. Stat Sheet

Vs Sheet - average groups variability

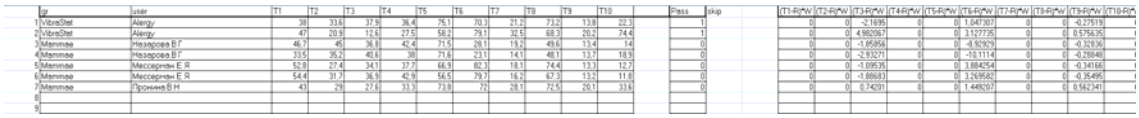

Fig. 5. Vs Sheet

Vs graph Sheet - the histogram of results of two group's comparison of. The number of columns on histograms corresponds to number of ***_measurement.xml files on which the analysis was process. Dark blue color shows the data on «Group 1», red - on «Group 2».

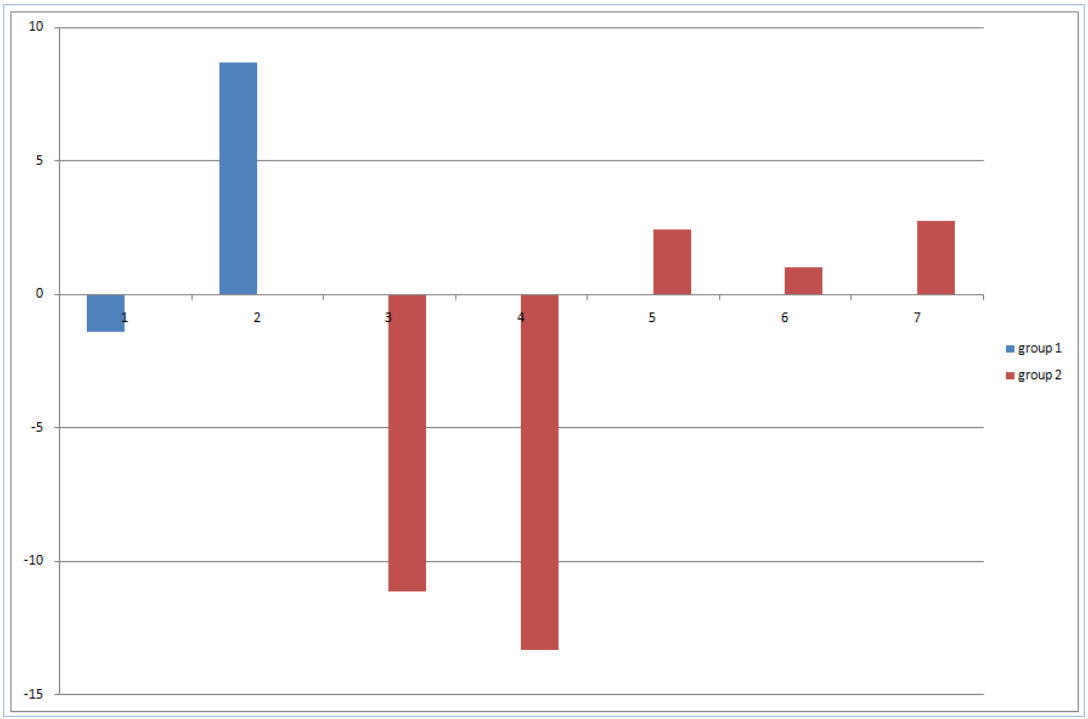

Fig.6. Vs graph Sheet

M-S Sheet - the histogram of comparison results of M parameters (the first pair columns) and S (the second pair columns) for all parameters T1-T10. Dark blue color shows the data on «Group 1», red - on «Group 2».

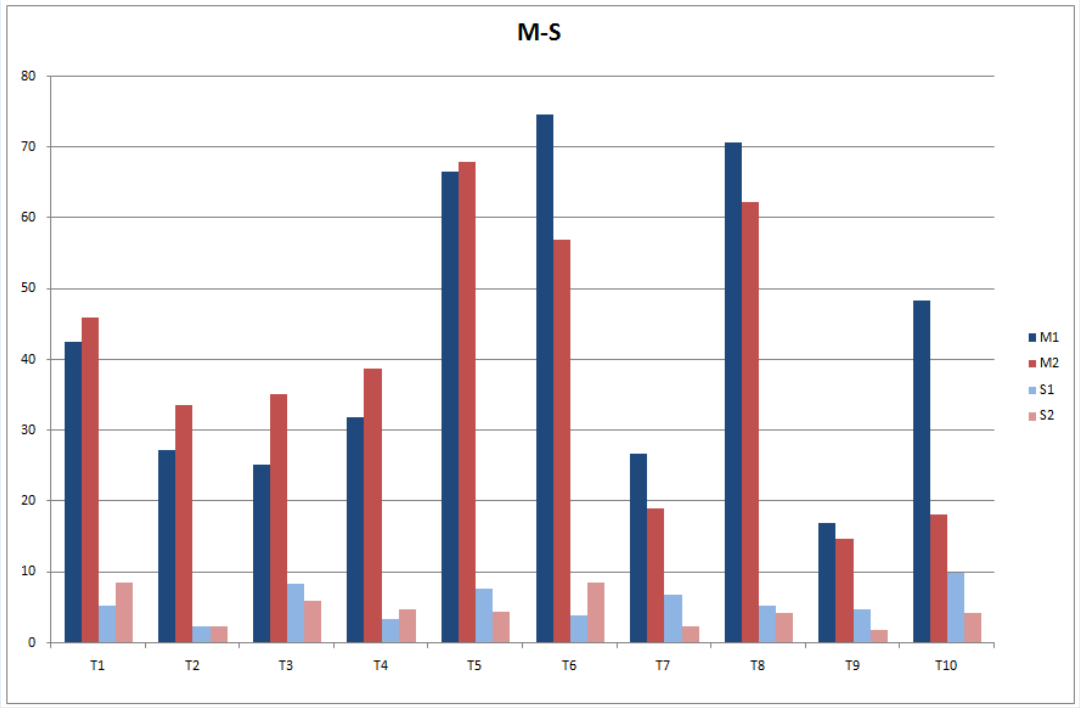

Fig. 7. M-S Sheet

M1-M2 Sheet - the histogram of results of M parameters comparison for all parameters T1-T10. Dark blue color shows the data on «Group 1», red - on «Group 2».

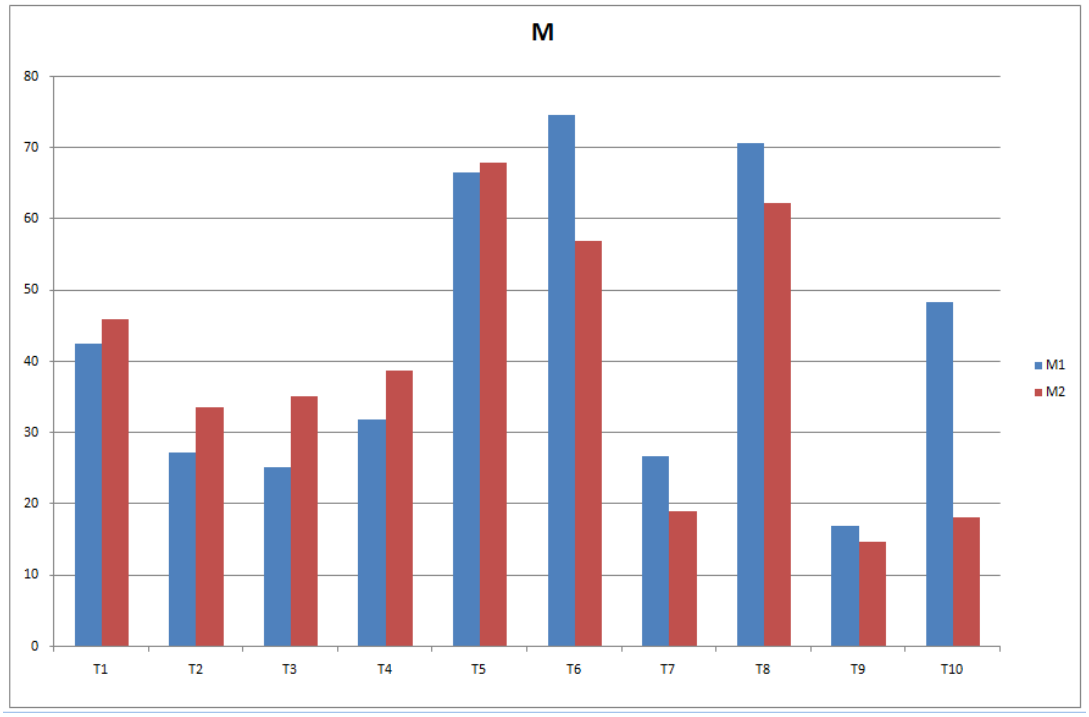

Fig. 8. M1-M2Sheet

S1-S2 Sheet - the histogram of results of S parameters comparison for all parameters T1-T10. Dark blue color shows the data on «Group 1», red - on «Group 2».

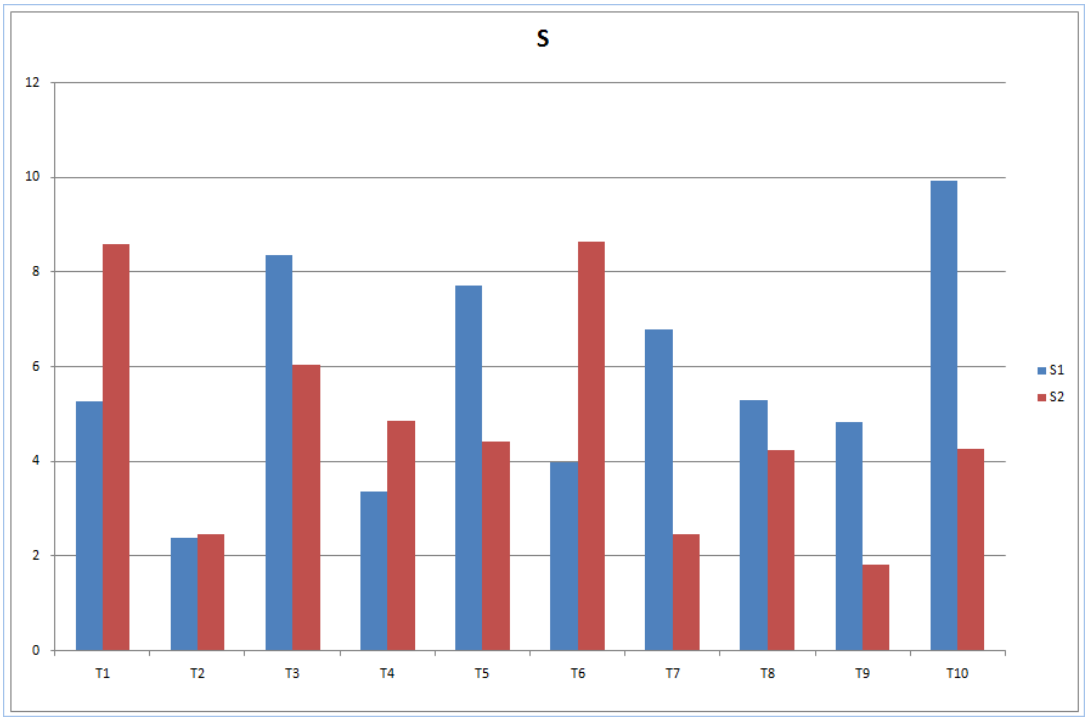

Fig. 9. S1-S2 Sheet

V1-V2 Sheet - the histogram of results of V (variability) parameters comparison for all parameters T1-T10. Dark blue color shows the data on «Group 1», red - on «Group 2». The big differences in graph for two groups testify to the occurred physical deviations between patients of groups.

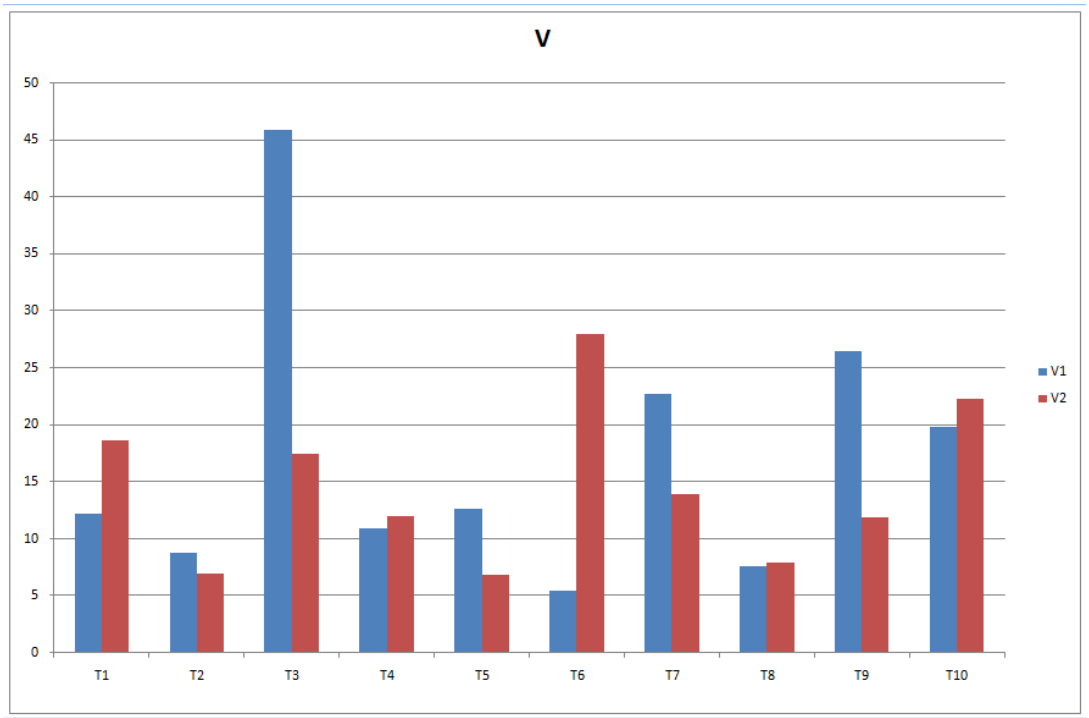

Fig. 10. V1-V2Sheet

5. Analysis results

Provided results analysis mostly depends on the research aim. It is often necessary to define parameters - markers of status changes which are significantly differ between two groups. Listing 10 psychophysiological parameters (as emotion 10 print) characterizing various single properties of a person status and a general status of the person, too. Micromovements parameters of person are changed during a deviation of a person status from normal, that shows a deviation of the corresponding vibraimage parameters. The analysis of person reflex micromovements in the biological nature is similar, for example, to the biochemical analysis of person blood which reflects biochemical and energy exchange process in an organism. Only with the help of vibraimage technology the analysis of micromovements is carried out simply, remote, friendly and nonintrusive.

On an example (fig. 10) it is visible, that the most significant distinction is observed between parameters of variability T3, T6 and T9 which should be chosen as the basic markers of status changes for results of the experiment showed in figure. It is natural, that quantity of measurements and test specifications can have influence to the results. It is important to fulfill the main principles of Vibraimage technology in detail enough stated in the Vibraimage PRO Description during providing source measurements.

Below (fig. 11) given sample of test for two different status of one person, the first group of measurements show vibraimage testing of person in active status, the second group of measurements show vibraimage testing of person in drowsiness status. Fig.11 shows a strong difference of vibraimage parameters for person in these different statuses.

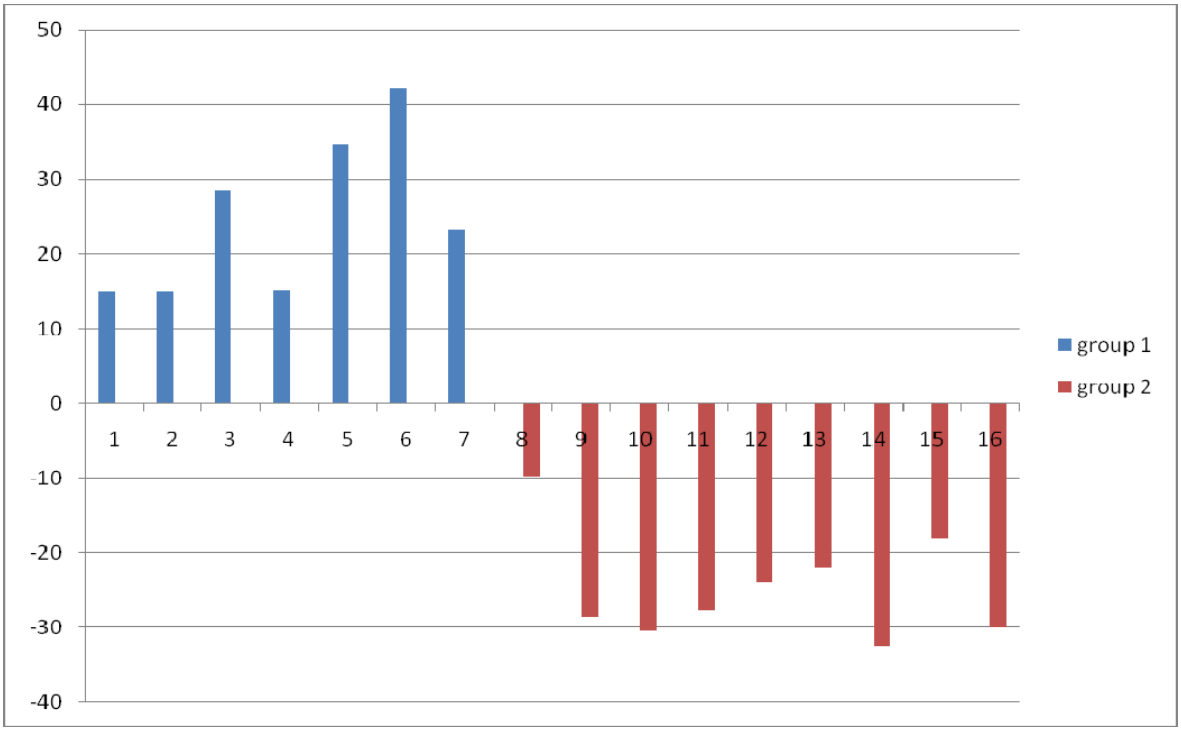

Fig. 11. List Vs graph. Compatibility results for status Active (1)- Drowsiness (2)

On the Fig 12 given V1-V2 list - results comparison histograms of variability (V) parameters for previous measurements status Active (1) - Drowsiness (2). This histogram indicates what statistics difference of concrete vibraimage parameters divide Active status from Drowsiness status. This is significant difference in variability of T1,T4 and T7 parameters.

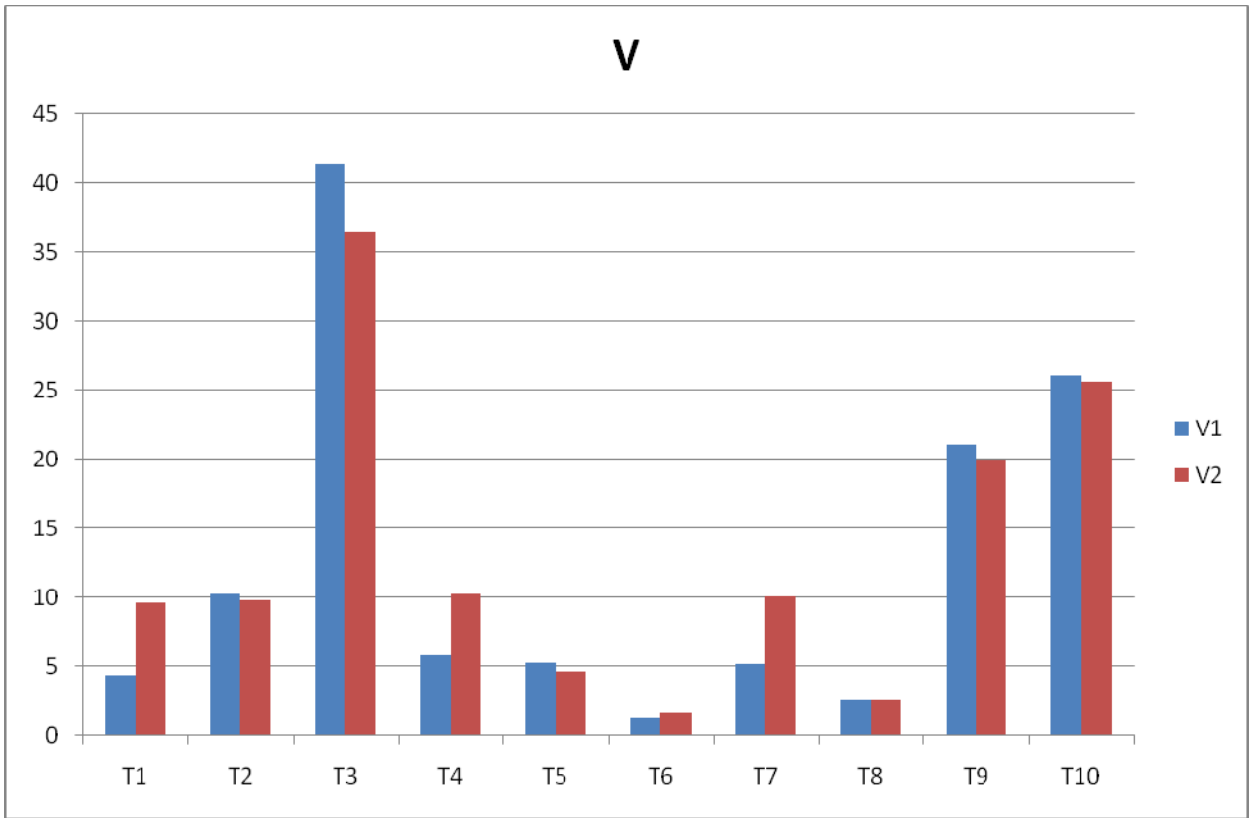

Fig. 12. List Vs graph. V1-V2 list. Results comparison histograms of variability (V) parameters for status Active (1) - Drowsiness (2)

So, VibraStat program obviously shows if there are significant difference between two statuses (or groups of people) like on Figs 11-12. Or in other way both groups results could be similar like on Fig. 6.

6. License

VibraStat program presented for open access to all licensed users of program **Vibraimage PRO**.

Updates and questions on www.elsys.ru

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