THE ODESSA NATIONAL POLYTECHNICAL UNIVERSITY

SCIENTIFICALLY RESEARCH LABORATORY "DIAGNOSTICS"

The SRL "Diagnostics" spends works on working out and application of a modern quality monitoring of the various power equipment (the turbine, aviation both rocket engines and installations on their basis).

The basic directions of works:

1) The monitoring vibroacoustic activity of the rotor engine, working off and formation of techniques of an estimation of their technical condition taking into account features of operation..

2) The analysis of abnormal activity for the purpose of formation of recommendations about improvement of a design of the rotor engine.

3) Working out and manufacturing of complexes of the control, diagnosing and emergency protection of the rotor engine.

4) Working out of modules of the measuring equipment working in extreme conditions.

Following projects are offered:

1) Elements of systems of diagnosing GTE and the rotor engines.

2) Increase of reliability of reception of the information from the equipment working in heavy environmental conditions.

Elements of systems of diagnosing GTE and the rotor engines

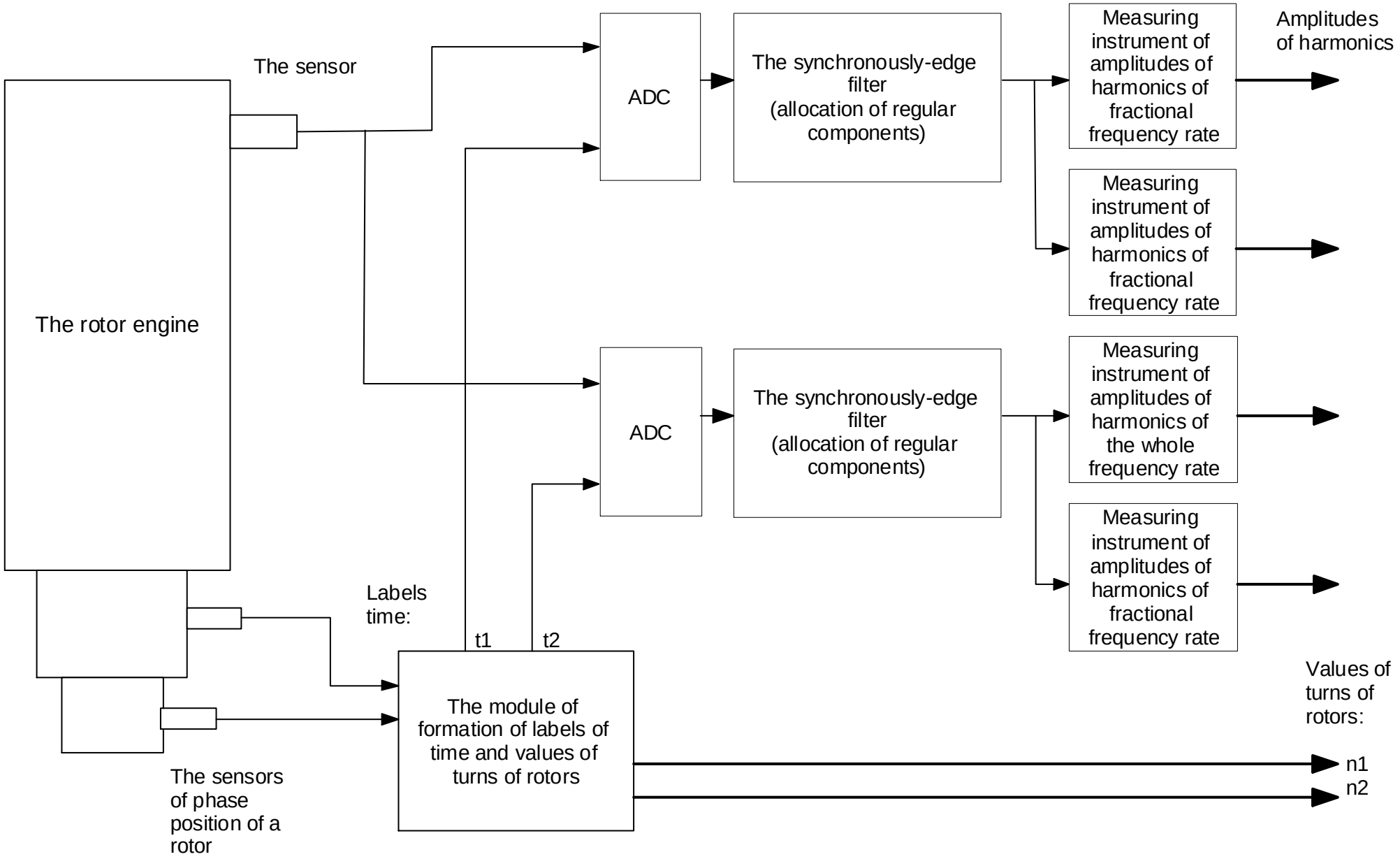
Measurement and processings the vibroacoustic signals of GTE and rotor engine with use of algorithms of synchronous allocation of parametres and a possibility estimation on their basis of formation of diagnostic signs..

Harmonics in a spectrum виборакустического a signal, the rotations of a rotor connected with current frequency, have received the name of regular components.

Existing methods of formation of estimations of diagnostic parameters do not allow allocating regular components with sufficient accuracy or demanding the task of special power setting.

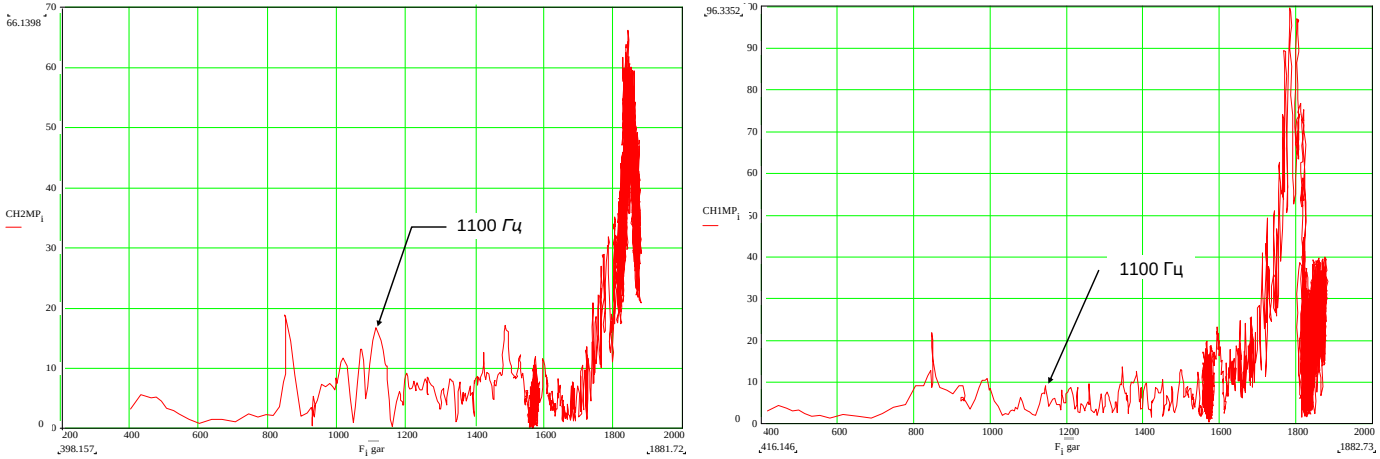
Elements of systems of diagnosing GTE and the rotor engines

Structure of system of measurement of parametres of regular components

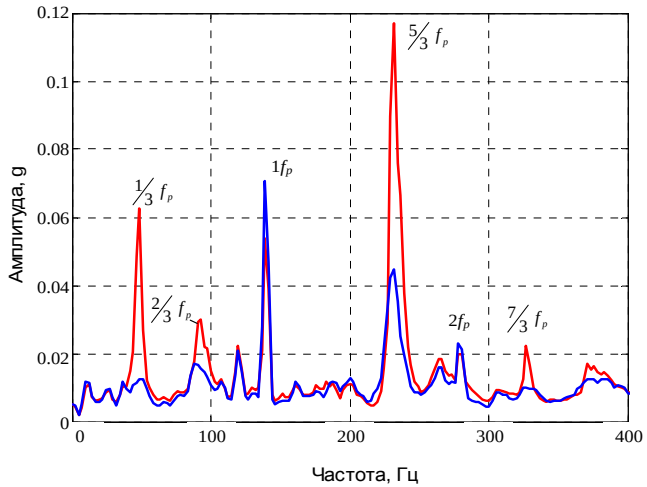


Elements of systems of diagnosing GTE and the rotor engines

Results of diagnosing with use of parameters of regular components



Dependence of amplitude of a harmonic роторной frequencies in parameters of a pulsation of pressure in a flowing part the rotor engine at change of frequency of rotation of a rotor, detection of abnormal reaction on frequency of 1100 Hz



Display of fractional harmonics роторной frequencies in the presence of defect

Increase of reliability of reception of the information from the equipment working in heavy environmental conditions

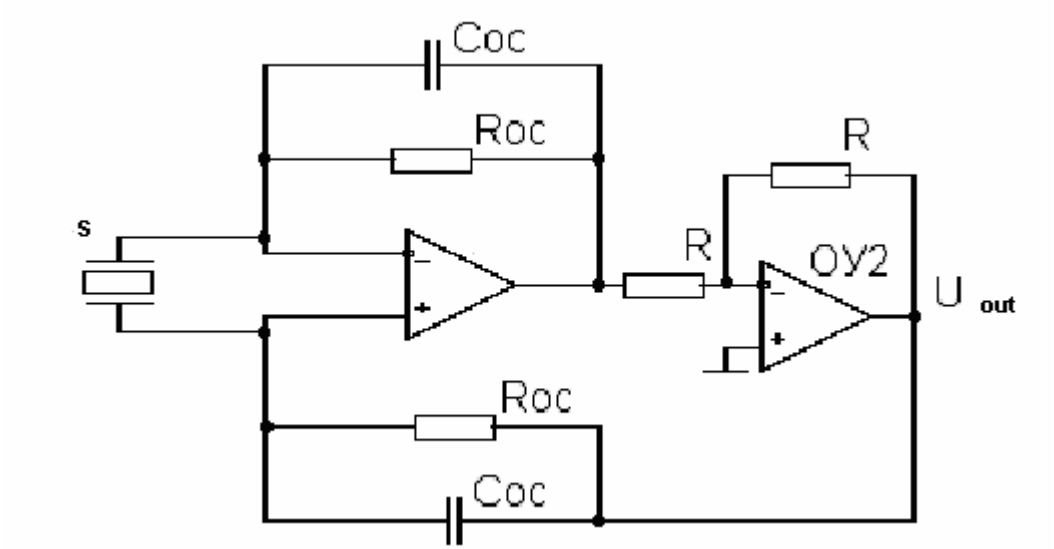
Maintenance of preservation of functioning of piezoelectric gauges in the conditions of gradients of temperatures

The decision under indemnification of influence of gradients of temperatures on a piezoelectric crystal of sensor is offered.

The decision based on correction AFC.

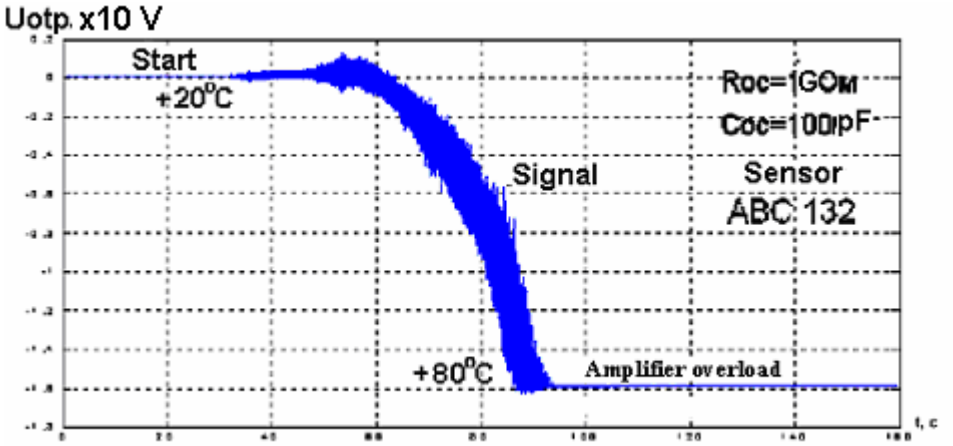
Increase of reliability of reception of the information from the equipment working in heavy environmental conditions

Arrangement piezoelectric sensors on the unit

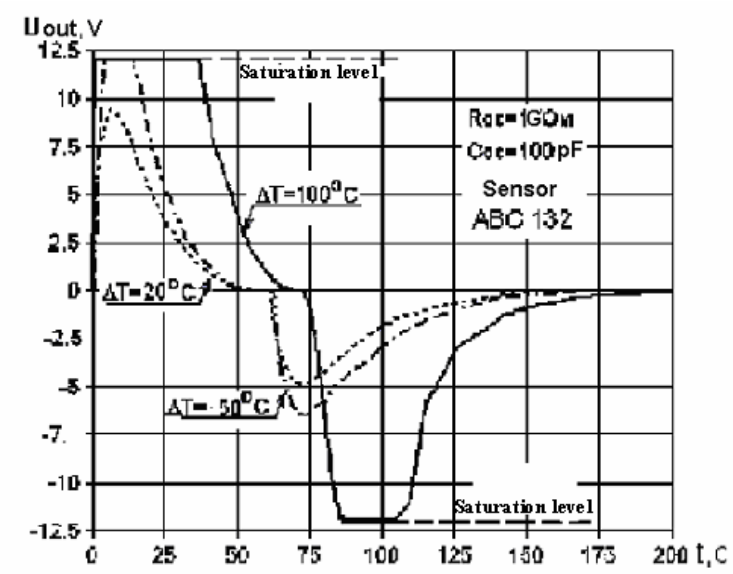


Standard the symmetric amplifier of charge

Increase of reliability of reception of the information from the equipment working in heavy environmental conditions

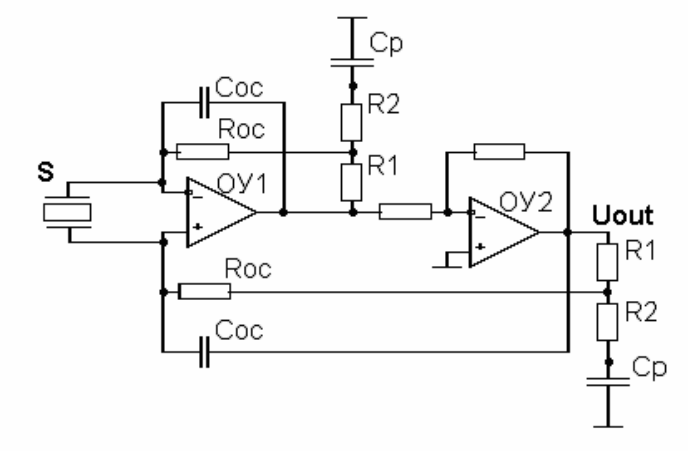


Record of the signal received at test of the unit

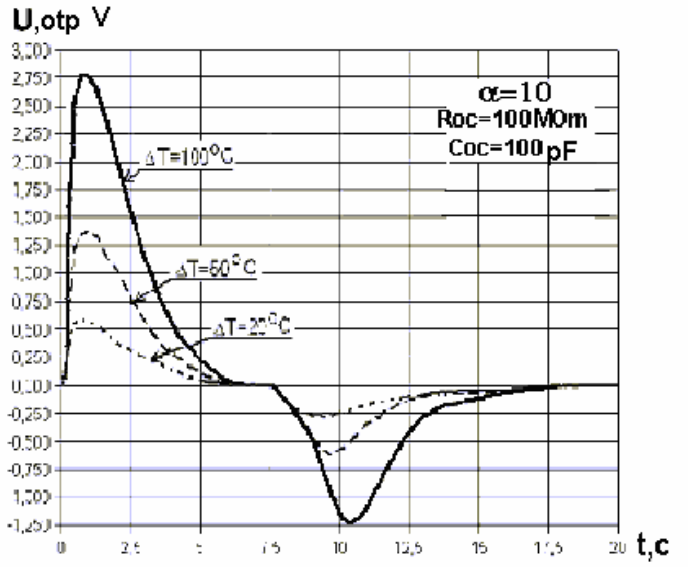


Change of out level the amplifier of the charge, caused by influence of temperature drops on the piezoelectric sensor

Increase of reliability of reception of the information from the equipment working in heavy environmental conditions

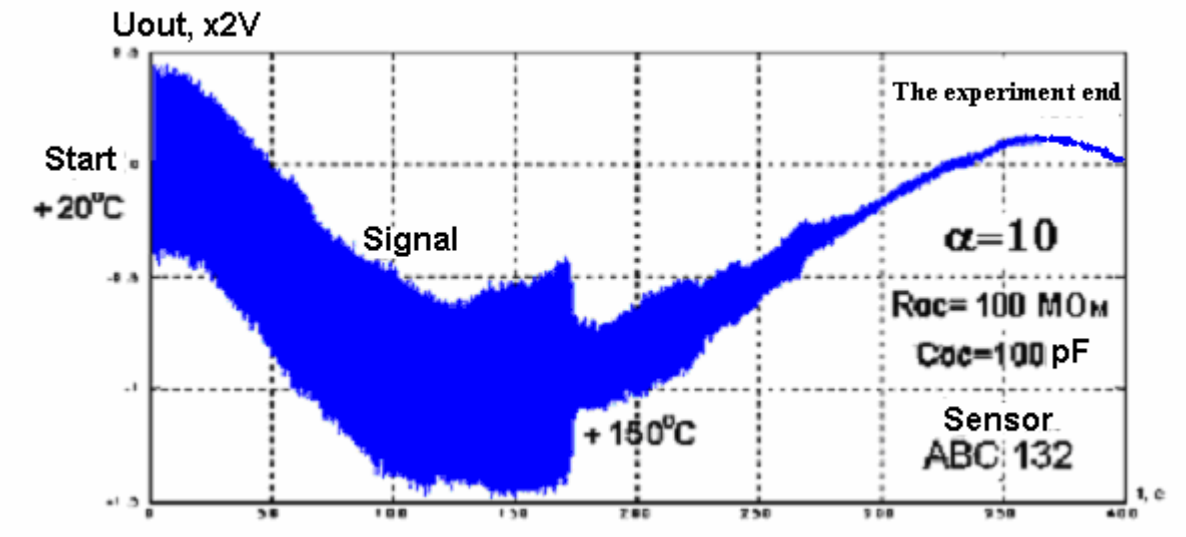


The amplifier of the charge with correction of the frequency characteristic



Change of out level of the amplifier of the charge with correction is peak the frequency characteristic (α =10), caused by influence of temperature drops on the piezoelectric sensor

Increase of reliability of reception of the information from the equipment working in heavy environmental conditions



Record of a signal received at under indemnification of influence of gradients of temperatures.

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The measuring complex

The processing complex