

DYNAMICS AND STRENGTH OF MACHINES Department



http://users.kpi.kharkov.ua/dpm

NTU «KhPI»

Specialities in the department



Specialities in the department



Computational Mechanics

<u>The main diploma projects</u> deals with the development of the mathematic and computer models for the investigations of the behavior of mechanical systems, analysis of their structural strength, dynamic properties and prediction of the reliability and the life-time.

The applications concern to solution the problems in the fields of turbomachinery, transport and other mechanical engineering objects.

The main topics are:

- Analysis of the strength of designs
- Creep modeling
- Modeling of the composites
- Investigations of the dynamic properties
- Analysis of vibrations
- Analysis of random vibrations
- Analysis of nonlinear vibrations
- Reliability prediction
- Biomechanics







Specialities in the department



Informational Technology in Engineering

<u>The main diploma projects</u> deals with the development of the informational systems of the automatization of design process.

The applications concern to solution the problems in the fields of turbomachinery, transport and other mechanical engineering objects





CONTACT PROBLEM FOR A CYLINDER SHELL WITH A COMPOSITE BAND

<u>Project description</u> Analysis of the contact behaviour between the pipe and the composite orthotropic shroud. Stress and strain state of this system.



Stress and strain state of the pipe with the band



Gap length GL from band length L curve

ANALYSIS OF THE CONTACT BEHAVIOUR AND THE STRESS AND STRAIN STATE OF THE RAILWAY WHEELS.

<u>Project description</u> The development of model of the interaction of the railway wheel with the metal track and the wheel axle while the train turns.





MODELING OF THE MICRO-MECHANICS OF THE REINFORCED COMPOSITES

<u>Project description</u> Definition of the average orthotropic elastic properties of the reinforced cubic composite materials.













ANALYSIS OF THE CONTACT BEHAVIOUR OF PNEUMATIC TIRES

<u>Project description</u> Development of the detailed structural models of pneumatic tires, which are taken into account the orthotropic properties of ply and nonlinear deformation.









SIMULATION OF THE TECHNOLOGICAL PROCESS OF THE COLD ROLLING.

<u>Project description</u> The work deals with the technological process of profiling of round tube into the pipe with square section. Workpiece at a constant speed is pulled through the rollers. The analysis of the stress state under plastic condition of workpiece is under consideration in the project.



ANALYSIS OF THE FATIGUE LIFE-TIME OF THE WIND TURBINE BLADES.

MODAL SOLUTION

STEP=1

<u>Project description</u> The work deals with the analysis of the vibrations of wind turbine blades and the modeling of the process of accumulation of fatigue damage.

ANS



NODAL SOLUTION

STEP=1

SUB =1





ANS

.103E+09

.115E+09

Ν

.897E+08



ANALYSIS OF THE DYNAMIC PROPERTIES OF TURBOCOMPRESSOR.

<u>Project description</u> The work deals with the development of the detailed parametric FE model of the turbocompressor and analysis of it natural frequencies and critical velocities. The investigation of the influence of geometry parameters on the critical velocities of the system is also carried out in the work.



NONLINEAR VIBRATIONS OF THE STEAM TURBINE BLADES SUBJECT TO THE CONTACT INTERACTION IN THE DETACHABLE SHROUD

