Streszczenia

OCENA STANU KONSTRUKCJI BELKOWYCH NA PODSTAWIE ZMIANY PARAMETRÓW MODALNYCH WYWOŁANYCH DODATKOWĄ MASĄ

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This paper presents the application of the nondestructive damage identi.cation method using an additional parameter introduced to the structure. In this method the damage is identi.ed on the basis of the variations of dynamic parameters without knowledge of the initial values of undamaged structures. In the presented numerical examples, method are applied for the analysis of the dynamic response of cantilever beam for identi.cation position of damage and the extent of damage. The assessment of the state of a structure relies on the comparison of the structure eigenfrequencies obtained from the systems with additional masses placed in di.erent nodes.

ANALIZA KORELACYJNA DRGAŃ LOSOWYCH MOSTU WANTOWEGO OBCIĄŻONEGO PORYWISTYM WIATREM

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The paper concerns stochastic analysis of cable-stayed bridge response due tothe dynamic action of gusty wind. Non-stationary wind model with time dependent periodic mean speed is presented for investigating the buffeting bridge response amplified in resonant regime. Equation of motion is formulated by substructure technique. Buffeting forces are derived under the assumption that their span-wise correlation is the same as that of incoming wind fluctuations. The bridge response is obtained neglecting structure nonlinearities, as a sum of component responses due to buffeting forces acting on scattered deck sections. Mean function and variance of bridge response are obtained. Two approximate formulas of variance are derived by using two mathematical models of wind turbulence correlations. The outline of numerical application is presented.

ZMIENNOŚĆ PARAMETRÓW MODALNYCH W ZALEŻNOŚCI OD CHARAKTERU ZNISZCZENIA ELEMENTÓW BELKOWYCH

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The paper discusses methods of diagnosing the technical condition of reinforced concrete beams, based on the change in dynamic characteristics. The objects of research were reinforced concrete (RC) beams. Testing of RC beams included both static and dynamic tests. A series of step loaded static tests was aimed to produce successive damage to the beams. After each load step (at the moment of displacement and strain stabilization), dynamic testing followed. On the basis of the obtained results from different beams (different distances between supports), an effort was made to correlate the data concerning the damage of the tested beams with the changes of the modal parameters.

WYZNACZENIE OPTYMALNYCH PARAMETRÓW MECHANICZNEGO TŁUMIKA DRGAŃ METODĄ ROJU CZĄSTEK (PSO)

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Mechanical vibration dampers (MVD) can be used for reduction of tower type structures vibrations. A method of determination of optimum parameters of MVD mating with this type of structures was described in [1]. The worked out computational method became the basis for design solutions. Taking in the consideration the type of the structure (tower), the analysis concerned the amplitude-frequency characteristic $|H_{n,n}|$ at the top of the structure, because this is the point of maximum displacements corresponding with the first or the second natural frequencies of the structures under consideration. It may however happened that it is necessary to reduce the values of an amplitudefrequency characteristic corresponding with several different natural frequencies of a structure. That kind of result can not be reached by means of only one damper. When one decides to use more than one MVD, he must determine not only the optimum parameters c_t and k_t of these dampers, but also to choose their positions. To solve this problem it is not enough to apply the method of optimization described in [1].

In the present paper the authors have checked the possibility of application of the particle swarm optimization (PSO) method, to solve the present problem. It has been shown, that this method enables to determine the optimum parameters of several MVD mating with a structure. Each of these dampers can be "tuned" to an other natural frequency of the structure. The method allows also to determine the optimum positions of the MVD-s. Presented in the paper examples show, that the method can be practically used. In this way, the scope of the methodic described in [1], has been broadened to the new kind of objects, where it is necessary to apply several MVD-s placed in the different points of a structure.

ANALIZA ODPOWIEDZI DYNAMICZNEJ WYBRANYCH BUDOWLI WIELOPODPOROWYCH NA NIERÓWNOMIERNE WYMUSZENIE KINEMATYCZNE

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The paper presents analysis of dynamic response of multiple support structures to seismic and mining related paraseismic excitation. Dimensions of the basis of structures are comparable with the length of the wave propagating in the ground and due to it they are exposed to non-uniform kinematic excitation. Calculations of the dynamic response were performed for earth dam at Niedzica and for concrete bridge at LGOM. It was stated that non-uniformity of ground movement may cause significant changes in the dynamic response – both its reduction as well as its growth.

MOŻLIWOŚCI ZASTOSOWANIA ROZKŁADU WZGLĘDEM WARTOŚCI SZCZEGÓLNYCH W ANALIZIE WIBROAKUSTYCZNEJ OBIEKTÓW BUDOWLANYCH

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The possibilities of application the mathematical method – Singular Value Decomposition in wibroacoustical analysis of building objects on sacral objects example were shown in the paper. Singular Value Decomposition (SVD) is a technique used in the reduction of matrix sizes and analysis of independencies of variables. Application of this tool in acoustic problems of sacral interiors gave the possibility of analysis of proposed index method of acoustic assessment of sacral objects. The dependencies between partial indices were obtained from SVD as well as the formulae which can approximately assess global acoustic quality of sacral interior. The verification of index method with SVD was performed for six real roman-catholic churches. The approximate global index and partial indices can be used for acoustic assessment of real interior where acoustic adaptation is needed as well as for designed sacral rooms. The proposed indices are calculated from simulation research on created geometrical model. The inverse problem was formulated in the paper, where at the assumed global index, partial indices determining individual properties - are looked for.

METODA KOLOKACYJNA WYZNACZANIA PARAMETRÓW TŁUMIENIA DRGAŃ W KONSTRUKCJACH BUDOWLANYCH

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The paper presents the collocation method of determination damping coefficients of structural vibration. Moreover, usage of this method for several different building structures have been presented.

ZAGADNIENIA OPTYMALIZACJI PARAMETRÓW WIELOKROTNYCH STROJONYCH TŁUMIKÓW MASOWYCH

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The paper deals with the problem of parameters optimizations of multiple tuned mass dampers (MTMD) for multi-degree-freedom-system. Theoretical considerations have been illustrated by numerical examples.

MASZYNOWE UCZENIE RUCHU MOBILNEGO ROBOTA KOŁOWEGO

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In this paper, we proposed an algorithm used in feedback control of a wheeled mobile robot, based on approximate dynamic programming, in form of an actor–critic structure (ACE–ASE). An algorithm operates in discrete time, it uses parametric structure – actor (ASE) in form of neural network, to approximate nonlinear functions of mobile robot in control law, and critic (ACE) that generates rating of control quality. Verification based on experiment using Pioneer–2DX wheeled mobile robot, confirmed correctness of assumed control algorithm.

INTELIGENTNE STEROWANIE ROZMYTO-NEURONOWE UKŁADEM DYNAMICZNYM

Zenon Hendzel, Magdalena Wereszczak
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In this paper was introduced fuzzy-neural algorithm adaptation conclusions rule base, applied to approximation nonlinearity mobile circular robot. Computer simulation proposed solution was realized in emulator 2 circular mobile robot.

WPŁYW ZMIAN LEPKOŚCI OLEJU SILIKONOWEGO W TŁUMIKU DRGAŃ SKRĘTNYCH NA WIELKOŚĆ ROZPRASZANEJ ENERGII I KĄT SKRĘCENIA WAŁU KORBOWEGO SILNIKA

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General description of fluids applied to viscotic torsional dampers are presented in this paper. Results of experimental investigations of fluid viscosity influence on dissipated energy and angle of torsion of crankshaft as well as results of numerical computations are also included.

WERYFIKACJA ODPORNEGO STEROWANIA ROZMYTEGO RUCHEM NADĄŻNYM MOBILNEGO ROBOTA KOŁOWEGO

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The problems addressed in the thesis concern important and up-to-date issue of the mechatronic design of the robust control systems of follow-up motion of the mobile wheeled robots. In the thesis the synthesis of control algorithms based on stability theory of Lapunov was carried out along with simulation analysis of the three control algorithms of the follow-up motion of the mobile wheeled robot with consideration of the parametric naccuracy: analytic robust sliding control algorithm, robust sliding control algorithm with fuzzy compensation control, fuzzy algorithm of sliding control. The mobile wheeled robots Pioneer-2DX was a real object, which was used for verification of research.

IDENTYFIKACJA USZKODZENIA W PASMIE ALUMINIUM Z WYKORZYSTANIEM MIEKKICH METOD OBLICZENIOWYCH

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This paper presents an application of non-destructive damage detection method based on structural wave propagation phenomenon. A set of laboratory experiments on aluminium strip was carried out. Several failure cases were introduce into the laboratory model. Elastic wave was actuated and received by piezoelements. Recorded signals were processed using wavelet analysis. Obtained signal parameters were used as an input vector of artificial neural networks. Several network architectures were tested.

DYNAMICZNE EFEKTY DZIAŁANIA OBCIĄŻENIA UŻYTKOWEGO NA CIĘGNO NOŚNE NAPOWIETRZNEJ KOLEI DWULINOWEJ

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The model of a carrying rope of a bicable ropeway system under in-service loads is introduced to analyze dynamic response of the cable during: start and steady ride of passenger carriers, an emergency stop of operating system. The pendulum model of a moving carrier is formulated to define loads acting on the cable. Equations of motion of system composed of continuous cable and a set of traveling pendulums are derived by applying Ritz approximate method and Lagrangian description of motion. Some illustrative numerical results are presented to demonstrate applicability of proposed method in an analysis of cable vibrations.

A NUMERICAL MODEL FORMULATION FOR THE UNDERGROUND RAILWAY VIBRATION PREDICTION

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This paper discusses a theoretical-numerical model formulation for the prediction of vibrations from underground railway tra_c. The model takes into consideration transfer functions between the track lying in the underground tunnel and a free field. The rolling stock can be modeled as a multi-body vehicle chain. The dynamic axle loads due to the rails and wheels irregularities may be estimated. In the model a wheel–rail single point Hertzian contact is assumed. As for the dynamic track and tunnel compliance the transfer functions can be computed and/or measured. The entire model can be validated by means of vibration ”in-situ” measurements.

BADANIE DRGAŃ UKŁADU Z LISTWĄ W ZACISKU PRZY UWZGLĘDNIENIU NIELINIOWEGO MODELU TARCIA

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In the work presented of physical model of the system with joint elastic strip in the rigid clamp. Nonlinear friction model contact between elastic strip and rigid clamp, taking structural friction into account is presented. During load, relieve and again load free part of the strip, displacement in a function of the longitudinal force external was determined. The obtained dependences of the displacement enable determination of the hysteresis loop describes elasto-frictional properties of the joint. The mathematical model of vibrating system with an elastic strip in a rigid clamp was built. The equation of motion for the nonlinear system were solved numerically and its damping characteristics were investigation.

SYMULACJA PĘTLI HISTEREZY BETONU Z WYKORZYSTANIEM SZTUCZNYCH SIECI NEURONOWYCH I METOD BAYESOWSKICH

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Feed-forward layered Artificial Neural Networks (ANN) learnt by means the evidence procedure for Bayesian technique are used for simulation and prediction of hysteresis loops. Concrete hysteresis loops obtained by cyclic loading are considered. ANN were learned and tested on the experimental data. The prediction of the stress - strain relation was made for the last part of the experiment, basing on its previous stage.

PRZYKŁAD REDUKCJI DRGAŃ BELKI

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Problem of active reduction of vibrations of continuous system by means of punctual action is formulated in this paper. Model of beam with taking into consideration internal damping material of beam is considered. Forms of individual vibrations are determined by Fourier’s method. Analysis of proposed way of reduction of vibrations is carried out by Galerkin’s method. There are results of numerical analysis in the graphic form.

PROGNOZOWANIE INTERAKCJI DYNAMICZNEJ GRUNT-BUDYNEK W PRZYPADKU DRGAŃ WZBUDZANYCH WSTRZĄSAMI GÓRNICZYMI

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The paper deals with the analysis of the soil-structure interaction in case of the transmission of ground vibrations from mining tremors to medium-height building foundation. The one of parameters used in scales of mine-induced dynamic influences (GSI-2004) to evaluate the harmfulness of ground vibrations to surface structures – maximal values (amplitudes) of resultant acceleration of horizontal vibrations were applied. The influence of mining tremors parameters as mining tremor energy and epicentral distance on the soilstructure effect is also discussed. Neural networks were used.

ZASTOSOWANIE METODY APROKSYMACJI POŁĄCZONYCH DO WYZNACZANIA CZĘSTOTLIWOŚCI DRGAŃ WŁASNYCH ŚCIAN KONSTRUKCYJNYCH BUDYNKÓW PO MODERNIZACJI

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The paper deals with the evaluation of the natural frequencies of vibrations of the modified typical medium-height load-bearing walls modeled as the reinforced concrete thin plates. The small and the large changes of the wall stiffness and mass resulted from the new door-ways size and position were discussed. The Combined Approximations (CA) hybrid method was used as an effective reanalysis approach. Some procedures with using the concepts of shifts and Gram-Schmidt orthogonalizations were introduced to improve the accuracy of the results.

IDENTYFIKACJA PARAMETRÓW LEPKOSPRĘŻYSTEGO TŁUMIKA DRGAŃ

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In the paper a new method of parameters identification of the three parameters fractional, rheological Kelvin model is presented. The parameters are estimated using results obtained from dynamical tests. The proposed method is simple and effective. Results of example calculation are presented and briefly discussed.

DRGANIA OKRESOWE, PRAWIE OKRESOWE I CHAOTYCZNE W PROCESACH TOCZENIA

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The paper is concerned with qualitative analysis of a non-linear model describing the vibrations in cutting processes. The model of the regenerative turning process is described by two delay differential equations. The influence of selected parameters such as the rotational velocity and the frequency of the kinematic excitations as well as the cutting speed and the cutting resistance on the character and level of vibrations is studied. The possibility of the excitation of quasi-periodic or chaotic oscillations for some values of the parameters has been shown. Zones of the sub-harmonic, quasi-periodic and chaotic vibrations were estimated by the methods of numerical integration. Bifurcation diagrams have been used to explain the phenomenon of vibration synchronization. Different types of vibration are illustrated by plots of time histories, phase and stroboscopic portraits.

IDENTYFIKACJA CECH DYNAMICZNYCH WYSOKICH BUDYNKÓW PODLEGAJACYCH WSTRZĄSOM GÓRNICZYM

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The report refers to the identification of dynamic properties of tall buildings subjected to mining tremors. Taking into consideration the theoretical analysis from [2], the identification of natural frequencies of 2 high buildings (12 story) subjected to strong and very strong mining tremors was carried out for the buildings on flexible ground and with the assumption of non flexible ground. The amplitude Fourier Spectra from measured vibrations of 12th story and the building foundation and the ration of these spectra were analyzed. The ground deformation during the building motion caused by rockbursts decreases natural building frequencies in the insignificant degree.

ZASTOSOWANIE ODWRACANYCH MODELI PARAMETRYCZNYCH DO IDENTYFIKACJI SIŁ EKSPLOATACYJNYCH

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The paper presents an attempt to identify forces acting on the control unit of a helicopter model during flight. The helicopter model will, according to the project assumptions, operate as an inspection robot i.e. it will autonomously fly in selected regions and monitor them with an embedded camera. It could be used for visual inspection of high masts or chimneys. Autonomous flying requires a sophisticated control system. The control unit is placed in an additional box hung under the fuselage. One of the stages of the unit development was examination of in-flight forces acting on the box and if it was necessary, a vibroinsulation selection. For this reason, an experiment was conducted. During the test, forces in the box suspension and accelerations in selected locations of the object were recorded. Having both, forces and responses in the form of vibrations accelerations, enabled to verify a force identification procedure. It is a procedure based on regressive parametric models inversion. The paper presents this method's description and an attempt to apply it to the described forces identification.

IDENTYFIKACJA OBCIĄŻENIA POWODUJĄCEGO UPLASTYCZNIENIE RAMY Z ZASTOSOWANIEM BAYESOWSKICH SIECI NEURONOWYCH

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This paper presents the application of Bayesian Neural Networks (BNN) in the identification of parameters of a load causing partial yielding of a cross-section of a portal frame. As the source of the data in the identification procedure the eigenfrequencies and eigenvectors are used. The applied BNN are either of SSN/MAP (Maximum A Posteriori) or of T-BNN (True Bayesian Neural Networks) type, the results are compared with the results of the identification performed using Standard Neural Networks (SNN).

WYBRANE ZAGADNIENIA DYNAMIKI STROPÓW PRZEMYSŁOWYCH Z USZKODZENIAMI

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Some unusual problems relating to the dynamics of the industrial ferroconcrete slab ceilings weighed down with machines are consider. The choice is make on the ground of the research results concerning the real constructions. Questions which are discuss concern the change of the stiffness as the result of incorrect execution of the ceiling as well as damages arising during its use. These are two kinds of problems: these of the construction which became weaker due to the machine oil's or chemical substances' effect and unilateral constraints problems (damage of the supporting construction's components).

WYKRYWANIE USZKODZEŃ KONSTRUKCJI Z WYKORZYSTANIEM FAL SPRĘŻYSTYCH ORAZ SZTUCZNYCH SIECI NEURONOWYCH

Piotr Nazarko, Leonard Ziemiański
Katedra Mechaniki Konstrukcji, Politechnika Rzeszowska

Examination of structures integrity and failures detection are nowadays of great interest for both civil infrastructure and industry systems. This paper presents Structural Health Monitoring (SHM) technique that was tested on several laboratory models and utilizes elastic wave propagation phenomenon. Furthermore, it describes signals feature extraction procedure by using Principal Component Analysis (PCA). Arti.cial Neural Networks (ANNs) and statistical learning theory are used to determine and classify structure's damages. The results show that data reduction using PCA, followed by implementation of ANNs patterns recognition, provide a good indication of failure occurrence and they may be used for SHM.

ANALIZA SIŁ ODDZIAŁYWANIA W UKŁADZIE OPERATOR – RĘCZNA SZLIFIERKA

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The paper presents the analysis of dynamic interaction between a hand-arm and a hand-held grinder. A model of the system has been introduced that consists of a discrete model of a grinder and a simply biodynamic model of the human hand-arm. Basic equations describing the motion of the system were introduced. The random vibration (PSD) analysis was done. Some general conclusions were presented and several recommendations on how the vibration level could be reduced.

NEURONOWY FILTR KALMANA W AKTYWNEJ REDUKCJI DRGAŃ KONSTRUKCJI BUDOWLANYCH

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This paper is devoted to research on using artificial neural networks as the neural Kalman filters. The Kalman filters are widely used in the active control of building structures. There are described two types of neural networks worked as Kalman filters: linear neural filters and two-layer feedforward neural networks. The neural Kalman filters were tested in simulations of the active control of the building structure model. The results of numerical computations are presented in this paper.

WYBRANE PROBLEMY KONSTRUKCYJNE I BADAWCZE CYLINDRYCZNEGO SPRZĘGŁA ELEKTROREOLOGICZNEGO

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The article describes basic tests of the following: power consumption (supply voltage 1-6 kV, current intensity 2 cm A 25 5 - , power supply 10-100 W), temperature increases as well as technical solutions and construction of the tested electrorheological clutch. Two types of fluid were described: one-phase liquid in the form of “liquid crystals", which does not undergo sedimentation or coagulation, and two-phase liquid in the form of “suspension” containing stabilizing agents. Factors determining rheological parameters of the prototype ER clutch were discussed. The article ends with conclusions and a summary.

DYNAMIKA DACHÓW PŁYWAJĄCYCH W ZBIORNIKACH NA CIECZE OD WPŁYWÓW SEJSMICZNYCH

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Seismic response of a floating roof covering a cylindrical liquid storage tank is considered. The analysed problem is a coupled problem of the fluid-structure type. A boundary integral equation is used to describe a hydrodynamic pressure of a liquid in the tank. The bottom of the tank and the floating roof surface are discretized using the triangular curvilinear 6-node boundary elements. The BEM is used to find the fluid mass matrix. The flexibility matrix of the roof is calculated using the finite element method computer program. Hydrostatic lift is modeled by analogy to forces of the Winkler foundation. The liquid is assumed to be inviscid and incompressible, the bottom of the tank is treated as rigid. The floating roof of a real structure consisting of a pontoon and a plate is analysed. Having found the natural frequencies and their corresponding mode shapes, the modal analysis of the vibrations of the roof excited horizontally by an earthquake is performed. The equation of motion is integrated using Newmark method. Numerical results of the liquid free surface waves and vibration of the floating roof in a storage tank subjected to real earthquake accelerograms are presented.

DRGANIA I STATECZNOŚĆ KOLUMN SPOCZYWAJĄCYCH NA PODŁOŻU TYPU WINKLERA REALIZUJĄCYCH WYBRANE PRZYPADKI OBCIĄŻENIA KONSERWATYWNEGO

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The results of theoretical and numerical research into the stability and transversal vibrations of columns rested on Winkler type elastic base, are discussed in the paper. Systems realizing load by a force directed towards the positive

pole and load by following force directed towards the positive pole are taking into account. The equations of motion and the boundary conditions of the considered columns are determined on the basis of the total mechanical energy. The solution to the problem of the statics and dynamics of the systems leads to the relationships on the basis of which the value of a critical load of the systems and the course of changes in the frequency of free vibrations in relation to the external load are determined. Vibration and stability results show the influence of chosen parameters that characterise the considered columns.

OPTYMALIZACJA KSZTAŁTU KOLUMN REALIZUJĄCYCH WYBRANE PRZYPADKI OBCIĄŻENIA EULERA ZA POMOCĄ ZMODYFIKOWANEGO ALGORYTMU SYMULOWANEGO WYŻARZANIA

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In this paper, we present the shape optimization method applied to slender`s systems (columns) subjected to Euler's loads. The method used to describe the problem, consist in dividing column into elements. These elements are described by their length (the same for every element) and variable diameter. Total potential energy is determined for two systems varying in loading method. Equation of motion and boundary conditions are determined by taking into account energetic method (the minimum of potential energy). Solution of boundary value problem leads to setting transcendental equation for the value of critical load. It is assumed that volume and total length of column are constant. Basing on this assumption, the shape's optimization comes down to matching diameters of particular system's elements. The maximum value of critical load is obtained for each set of diameters. The modified simulated annealing algorithm is used to finding maximum of critical force, which is described by function of several variables. Applied in the algorithm neighbourhood generator changes its behaviour with temperature function. Taking into account the method of column's mounting, the results of numeric calculations for chosen values of structures mounting's elasticity coefficient are presented.

STATECZNOŚĆ I DRGANIA SWOBODNE DYSKRETNEJ RAMY TYPU: SŁUP – RYGIEL OBCIĄŻONEJ SIŁĄ ŚLEDZĄCĄ SKIEROWANĄ DO BIEGUNA DODATNIEGO

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This paper concerns the issue of stability and free vibrations of discrete, twopart planar frame, built of frame bolt and frame column. Frame column is loaded by the follower force directed towards the positive pole. The loading and receiving head are built of the circular elements. Theoretical considerations are made concerning analysis of the system geometry and determination of relations for the potential energy and kinetic energy of the considered system. Adequate relationships describing stability of the considered frame are obtained taking into account energetic method or vibration method. An influence of geometrical parameters of loading head and rigidity of rotational springs modeling the finite stiffness of structural constraints on the critical load is analyzed. The courses of natural vibration frequencies in relation to the external load are determined.

DRGANIA I STATECZNOŚĆ SZCZEGÓLNEGO UKŁADU SMUKŁEGO PODDANEGO OBCIĄŻENIU SIŁĄ SKIEROWANĄ DO BIEGUNA DODATNIEDGO

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This paper concerns the issue of stability and free vibrations of slender system loaded by the force directed towards the positive pole. Two rod system connected with tube element is tested. The rope system is element of forcing head. It enables the application of the given direction and the point of application of external force towards considered column. The physical model of tested system and theoretical considerations related to determination of boundary conditions by using the method of mechanical energy variation are shown in this paper. Constructional scheme of the loading and receiving head is presented. Values of the critical force and the course of natural frequency in relation to the external load for given geometry and physical constants of the system are determined. The results of theoretical and numerical research are experimentally verified on the stand.

STATECZNOŚĆ I DRGANIA SWOBODNE KOLUMNY PODDANEJ OBCIĄŻENIU CZYNNEMU I BIERNEMU SIŁĄ ŚLEDZĄCĄ SKIEROWANĄ DO BIEGUNA DODATNIEGO ORAZ PODPARTEJ SPRĘŻYNĄ NIELINIOWĄ

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Theoretical and numerical research concerned of stability and free vibrations of slender system subjected to active and passive specific load is presented in the paper. Column supported at the one end by spring with nonlinear characteristics. The boundary problem was formulated one the basis of Hamilton's principle and of the small parameters method. Solution of boundary problem permitted carry out numerical simulations.

STATECZNOŚĆ I DRGANIA SWOBODNE SIŁOWNIKA HYDRAULICZNEGO SPRĘŻYŚCIE ZAMOCOWANEGO

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Theoretical, numerical and experimental research concerning of stability and free vibrations of hydraulic cylinder is presented in the paper. Considered hydraulic cylinder was fixed elastically and subjected to Euler's load. The boundary problem was formulated on the basis of Hamilton's principle. Mathematical model was confirmed by experimental research.

WERYFIKACJA OBLICZENIOWA WZORÓW EMPIRYCZNYCH DLA OBLICZANIA PODSTAWOWYCH OKRESÓW DRGAŃ PEWNEGO TYPU BUDYNKÓW ŚCIANOWYCH

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The paper is concerned with the prediction of fundamental vibration periods of multistorey shear wall buildings. The determination of natural frequencies is the key issue in designing of tall buildings. The calculation of natural frequencies and mode shapes is the first step in evaluation of the dynamic response of the structure by the modal superposition technique. The values of natural frequencies are also required in the determination of equivalent static loadings due to wind actions. The comparison of estimation of fundamental vibration period from the proposed in the literature formulae has been the main aim of the present paper. The empirical equations presented in the papers [1-4] have been considered. Computations have been carried out by using the following specialised computer programs for shear wall structures: BW for Windows [5, 6] and ETABS [7]. The paper has provided the comparison of fundamental periods of shear wall dominant buildings constructed by using tunnel form techniques, the models of which were discussed in the papers [1, 2, 8]. For more than 15-storey high buildings the results of computations using the continuous model of shear wall structure agree well with finite element analysis results.

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OCENA STANU NAPRĘŻENIA W ELEMENTACH BĘBNA PĘDNEGO GÓRNICZEJ MASZYNY WYCIĄGOWEJ

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Dimensioning rules of a mining hoist drive wheel that are actually in use, do not give a possibility to determine properly the stress and strain condition in the most afforded area of the structure, and the estimation of its fatigue life on that base is not possible. It seems necessary to undertake the effort aimed at development of the method to estimate the driving wheel elements technological condition regarding the fatigue phenomena. The results of dynamic analysis, strength analysis, and measurements verifying calculations that were made in actual object can make up a basis for further work on the revisal of relevant regulations. This elaborations may be considered as a step toward this enterprise continuation.

WSPÓŁCZYNNIK DYNAMICZNY DLA SZKIELETU GRUNTU W MODELU DWUFAZOWYM

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This paper deals with a description of the behavior of the two-phase soil layer (column) under periodic load. The soil layer (column) is fully saturated with single pore fluid and treated by the methods of continuum mechanics. Description of motion and deformation of soil is introduced as a system of equations consisting of governing dynamic consolidation equations based on Biot theory, selected constitutive and kinematic relations for small strains and rotation. The solution and results of simple one dimensional numerical analysis of the fully saturated layer under cyclic load are included. Also the so-called dynamic coefficient which shows amplification or attenuation of dynamic response is considered.

GENERATOR ZADANEJ TRAJEKTORII RUCHU OBIEKTU DYNAMICZNEGO

Wiesław Żylski, Piotr Gierlak
Politechnika Rzeszowska im. Ignacego £ukasiewicza

The fundamental problem of robots' dynamics and control is the computation of desired trajectoty for dynamical object. In order to do that, inverse kinematic problem should be solved. A singular inverse kinematics problem for the SCORBOT manipulator has been solved using the model with variable structure. Feedforward multilayered neural networks and genetic algorithm has been utilized in this model. The backpropagation algorithm has been utilized for training network. The neural networks have been used outside the singularity. In the singularity the genetic algorithm has been used for computation of the angular velocities. Results of the simulation have been presented.