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EDITORIAL

ARTICLES

Aspects Concerning the Dynamic Behavior of a Rotor-Foundation System

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Abstract: - The paper analyses the coupled vibrations of a rotor-foundation system, when the domain of the critical angular velocity is perturbed, which can lead to the damage of the shaft, by vibration of the gear, as well as of the foundation.
The phenomenon is studied by means of a two degree of freedom model, described by differential equations containing second-order terms. The analysis of the system starts from decoupled linear equations and continues by applying methods specific to the theory of the dynamic systems. The dynamic behavior is thus understood, while practical consequences can be drawn, regarding the optimal values of the parameters of the system.

Keywords: vibrations, rotor-foundation system, elasticity

Dynamic Response of Tower Cranes Under Seismic Actions. Case Study

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Abstract: - The dynamic model of tower cranes has been analysed and presented by authors in two other conferences as well as his mathematical model of the differential equations of movement, considering the tower cranes anchored on the buildings.

However, this paper presents the analytical solution for sinusoidal seismic actions in the case of the tower cranes without anchors. The solution is obtained for the MTO-180 tower crane. The diagrams of the absolute and relative displacements, velocities and accelerations are obtained and represented graphically by means of MATHCAD programme.

Keywords: - tower crane, dynamical analysis, differential equations, numerical results

The Concentrated Mass Influence on the Transversal Vibrations of a Bar

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Abstract: - In this paper one analyses the concentrated mass influence on the natural frequencies of a bar. The exact solution is presented, utilizing transfer matrix method, Rayleigh method and the approximate method which neglects bar mass. The application is referring on the case of a bar leaned at both its ends, having a concentrated mass placed on its middle.

Keywords: Vibration, bar, attached mass, natural frequencies.

Acoustical Materials – Sound Absorbing Materials Made of Pine Sawdust

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Abstract: - In this paper different type of acoustical materials, like absorptive barrier materials, silencers, damping treatments and vibration isolators will be described and compared. The influence of the structure and way of placement on the degree of sound absorption will be highlighted. The materials used in this study are made by the author from pine sawdust and polyurethane binder.

Keywords: acoustical materials, absorptive materials, structures, air space, sawdust

Evaluation of Absorption Coefficient of Biodegradable Composite Materials with Textile Inserts

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Abstract: - The paper focuses on experimental evaluation of acoustic properties of biodegradable composite materials with textile inserts used in products with protective role in urban habitat. To determine the absorption and reflection coefficients, the samples made from biodegradable composites were tested by means of impedance tube Bruel&Kjaer type 4206 A, with frequency range between 100-3200 Hz. It was noted that the tested specimens show a high absorption coefficient for frequency range 800 – 2800 Hz. Based on experimental results, the composition of tested materials will be improved to obtain a good absorption of low frequencies.

Keywords: - absorption, reflection, composite, frequency, impedance tube

Comparison between the NLMS and the NLMF Adaptation Algorithms Applied on Volterra Filters for Nonlinear Acoustic Echo Cancellation

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Abstract: - A nonlinear acoustic echo cancellation setup using a third order Volterra filter is proposed in this article. The assorted types of nonlinearities encountered in the Loudspeaker-Enclosure-Microphone system are modelled by different length Volterra kernels. The adaptation of the kernels is achieved employing both the Normalized Least Mean Square and the Normalized Least Mean Fourth algorithms. The comparison between these methods is performed in terms of Echo Return Loss Enhancement in order to emphasise the differences and similarities regarding the rate of convergence and the steady-state of the error in each case. In simulations, the behaviour of the proposed structures is underlined for two types of

input audio signals at different noise levels. The nonlinearity degree is kept constant throughout the simulations. Experimental results show the appropriate adaptive Volterra method for each acoustic noise scenario separately.

Keywords: - Volterra filters, adaptive algorithms, signal-to-noise ratio, error minimization

Numerical Simulation of Real Contact Between Two Bodies

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Abstract: - This paper presents the effects appearing inside a beam from a overpass of Arad-Timisoara highway due to impact with a high dumper of a moving vehicle. For this analysis it is developed a simplified calculation and a numerical modeling using ANSYS code and the obtained results in the two situations were compared and analyzed.

Keywords: - beam, impact, stress

On the Anomalous Doppler Effect

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Abstract: When an object is moving along an elastic guide the Doppler waves are excited. For a static observer, the Doppler wave emitted by the object coming to observer has the frequency higher than the frequency of the object. For the case when the object speed exceeds the minimum waves velocity the anomalous Doppler wave is excited. This time, the wave has the frequency lower then the frequency of the object. The anomalous Doppler waves may generate the instability of the vibration of the moving object. This paper presents the normal and anomalous Doppler effect for the case of a moving force along an infinite Euler-Bernoulli beam. This issue is relevant for the case of modern trains travelling along a track with soft soil when the trains speed exceeds the phase velocity of the waves induced in the track, and the results derived from a numerical simulation of this aspect are presented.

Keywords: anomalous Doppler wave, instability, limit cycle, track, railway vehicle

The Serb-Siton Solution for Isolation to Noise, Sock, Vibration and Seismic Movement at CETAL

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Abstract: - The Integrated Center for Laser Advanced Technologies (CETAL) is located on the IFIN-HH-non-nuclear activities platform, group II, Atomistilor Street No. 409, Magurele City, Ilfov County, in a reinforced concrete building with basement and 3 levels. In this building there are clean rooms where the level of noise and vibration must be within the E-Class (according to ASHRAE TC classification level 2.6 (curves) ISO VC - E) corresponding to a maximum level of decibels below 125micro inches/sec (50 dB) - 3,175μm/s to not affect the operation of the equipment installed in these rooms. Noise and vibration that can affect these rooms may come from the outside environment (earthquakes, road and rail transport, industrial activities conducted in the building) and the indoor environment (operation of equipment generating noise and vibration, such as air conditioning, pumps, fans, Shaker). Meeting this requirement was achieved by applying the SERB-SITON solution for isolation to noise, shock, vibration and seismic movement of the industrial objectives. Given the severe isolation requirements imposed for certain rooms at CETAL and the fact in the CETAL building that there are some important sources that generate noise and vibration, the isolation solution was applied differently for the whole building and clean rooms.

Keywords: - noise, shock, vibration, earthquakes, devices, phono-absorbant membrane

On the Assessment of the Vertical Vibration Behaviour of a Railway Vehicle

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Abstract: The paper deals with the assessment of the vertical vibration behaviour of a railway vehicle due to the random irregularities of the track. This issue is important to predict the running behaviour of the vehicle. Also, it is interesting from the view point of improving the vehicle design so as to increase safety and comfort of the railway transportation. The mechanical model of a railway vehicle consisting of a three rigid bodies – the car body and the two suspended masses of the bogies – is taken into account. The

two levels suspension of the vehicle is modeled using four Kelvin-Voigt systems. The frequency-domain response of the vehicle is calculated considering the influence of the wheelbase and bogie spacing filter effects. The effective acceleration of the car body is determined and, starting to this, the optimal damping of the second level of the suspension is calculated.

Keywords: railway vehicle, vertical vibration, running behaviour, damping