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Abstracts

Similarities and Differences of Physicochemical Properties of the di- and triacylglycerols under High Pressure Calculated from the Results of Ultrasonic Measurements

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Two samples of triacylglycerols i.e., olive oil and triolein, and one sample of diacylglycerol were investigated. In the course of compression, the density of the samples was determined by measurements of the change of piston position in pressure chamber and volume correction due to chamber expansion under pressure. The speed of sound was calculated from the time of flight of ultrasonic impulse between emitting and receiving transducers placed in the high pressure chamber. The adiabatic compressibility, intermolecular free length, molar volume, van der Waals' constant b and surface tension were calculated from the density, speed of sound and average molecular mass. All tested liquids undergo the high-pressure phase transition. Discontinues of the measured isotherms of the physicochemical parameters of the investigated oils indicate the presence of the high-pressure phase transitions. Moreover the change of pressure during the phase transition was measured. The fundamental difference in molecular structure of these acylglycerols influences significantly on their behavior under high pressure.

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The Simplified Method for Measuring the Improvement of Impact Sound Insulation of Floor Coverings

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Laboratory measurements of reduction of impact sound pressure level according to PN-EN ISO 10140-3 standard are difficult in realization. In order to fulfil basic methodology requirements they are performed using two chambers coupled vertically, which the upper is called source room and the lower – receiving room. These chambers are separated by a 140 mm thick reference floor made of concrete, on which the resilient surfaces are laid. In Poland only one research facility may carry out such measurements. This paper describes preliminary studies which are the basis for design an impact sound reduction test stand based on the devised simplified method. Author using the Statistical Energy Analysis shows that the improvement of impact sound insulation by floor coverings depends primarily on the parameters of the sample. Moreover, during the measurements the type of a chamber plays a secondary role. This thesis was also confirmed by in-situ measurements carried out in two different rooms.

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Model Studies of Sound Absorption Coefficient of Periodic Structures

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Basic theoretical considerations concerning the determination of sound absorption coefficient values assume that for the plane wave incident at an angle θ the reflected wave is also a plane wave reflected specularly. This assumption is true for isotropic, homogeneous and infinitely large planar surfaces. However, for spatial elements or flat surfaces possessing superficial impedance that periodically fluctuates, the reflected wave is a sum of n plane waves reflected at angles θ_n. In this case, the formula for a sound absorption coefficient $\alpha = 1 - |R|^2$, where $|R|$ is the magnitude of reflection coefficient is simplistic. In the paper the authors present a distribution of the sound field in front of different periodical surfaces for a plane wave oblique incidence. It was based on an analytical solution and numerical simulations using finite element method. Furthermore, taking into account the type of reflected waves the values of a sound absorption coefficient for the analysed structures were determined. Presented studies are the basis for mod-

The Study of Noise Generated during the Passage through the Bridge Expansion Joints

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Assessment of road noise, even though it is well parameterized, does not include all of the phenomena which may cause increased annoyance. One of examples is impulsive noise generated during passage through the bridge expansion joints, the special slots located in bridge structures in order to reduce excessive deformation caused by temperature changes. The paper presents the results of experimental studies on impulsive noise generated during the passages of vehicles. The measurable parameters of such signals useful in the identification and evaluation of annoyance was presented, together with an attempt of its assessment. It was reflected, that there is need for applying an impulsive adjustment in the evaluation of road noise, both the near and further away from the bridge construction.

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The Method for Estimating First and Second Derivatives of Digital Audio Signals

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In this paper the method for estimating first and second derivatives of a digital audio signals are presented. Calculations are based on traditional central-difference formulas with modifications that minimize round-off and truncation errors. FIR filters designed with modified cosine-sum windows are utilized for interpolation and fractional delay of audio signals. This is essential for the optimal step size selection to achieve desired accuracy of numerical differentiation. The proposed method are described and results are showed and discussed. The maximum relative error of estimating first and second derivatives with the proposed method are respectively 10^{-11} and 10^{-8} in the audio band.

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Cancer Malignancy Sonic Markers

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Currently, already almost a quarter of cancer diagnoses among Polish women is breast cancer. Every year there are more than 16.5 thousand of new cases, and in the next 10 years the number of women who become sick every year, will grow and exceed 20 thousands per year. The aim of our research was to build ultrasonic biomarkers to distinguish non-invasively between malignant and benign tumors as well as to assess their degree of malignancy. For the calculations we used raw ultrasonic RF signals (Radio Frequency) collected from patients of Cancer Center – Institute in Warsaw. In the studies we used parametric maps, describing the spatial distribution of physical parameters of lesions, such as tissue attenuation, backscattering coefficient and velocity dispersion. The texture parameters of these maps were analyzed using matrix GLCM (gray-level co-occurrence matrices). The best classifier were selected and used to build complex classifiers. Their suitability for classification of changes was evaluated by methods of statistical analysis. Results (curves ROC- receiver operating characteristic) of differentiation of breast lesions based on different types of complex classifiers will be presented and discussed.

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Analysis of the Influence of Cylindrical Duct Length on the Acoustic Attenuation Performance of Selected Helicoidal Resonator

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This work presents the analysis of the influence of cylindrical duct length on the acoustic attenuation performance of helicoidal resonator. The finite length ducts are the real elements of ducted systems like heating, dedusting and air ventilating systems. The silencers are often used at the ends of this kind of systems or at the duct sections placed at the fans outlet, which are often short, as well. Also the finite length ducts determine the acoustic attenuation performance, usually insertion loss, of silencing systems. Especially, acoustic resonators and reactive silencers are sensitive on the ducts lengths. Therefore, the different duct lengths are analyzed in this work to present the influence on acoustic attenuation performance of selected helicoidal resonator. The straight duct is analyzed, as well as different ducts lengths at the inlet and outlet of helicoidal resonator.

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The Method of Supporting the Planning Activities Limiting Exposure to Noise at Workplace

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In accordance with applicable regulations in the case of exceeding the permissible noise levels in the workplace it is necessary to take appropriate preventive actions. The most preferred methods are the direct reduction of exposure to noise. This can be achieved by reducing the noise at source or reduce the time of exposure to this harmful factor. In the case of complex schedule of a working day when the employee performs many tasks with different durations, being exposed to different noise levels associated