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**Mathematical Institute of the Serbian Academy of Sciences and Arts
Belgrade, 12.-14. September 2024.**

Editor: Ivana Atanasovska

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APPLICATION OF HYBRIDIZATION OF GWO-PUMA ALGORITHMS FOR IDENTIFICATION OF NON-ACOUSTIC PARAMETERS OF THE JCA

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ABSTRACT

The paper presents the identification of the non-acoustic parameters of the JCA model for determining the sound absorption coefficient of open-cell polyurethane foams using hybridization of the Grey Wolf (GWO) and Puma (PUMA) algorithms. The main advantage of hybridization is the combination of the excellent search of the space of possible solutions of the GW algorithm with the fast convergence of the PUMA algorithm. This prevents falling into the traps of local minima and enables the identification of the optimal parameters of the JCA model. For method validation, the sound absorption coefficient of the polyurethane foam was measured using an impedance tube according to the transfer function method (EN ISO 10534-2:2001). Then, the hybridized GWO-PUMA algorithm was then used to identify the JCA model parameters corresponding to the measured values. The results showed excellent agreement with an error of less than 1% compared to the experimental data. The identified values of the physical parameters can be used to design polyurethane foams with desired acoustic properties, which confirms the proposed GWO-PUMA hybridization algorithm as a valuable tool in designing acoustic materials.



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