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A New Computational Tool for Noise Prediction of Rotating Surfaces (FACT)

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Abstract : The air transport impact on environment is more than ever a limitative obstacle to the aeronautical industry continuous growth. Over the last decades, considerable effort has been carried out in order to obtain quieter aircraft solutions, whether by changing the original design or investigating more silent maneuvers. The noise propagated by rotating surfaces is one of the most important sources of annoyance, being present in most aerial vehicles. Bearing this is mind, CEIIA developed a new computational chain for noise prediction with in-house software tools to obtain solutions in relatively short time without using excessive computer resources. This work is based on the new acoustic tool, which aims to predict the rotor noise generated during steady and maneuvering flight, making use of the flexibility of the C language and the advantages of GPU programming in terms of velocity. The acoustic tool is based in the Formulation 1A of Farassat, capable of predicting two important types of noise: the loading and thickness noise. The present work describes the most important features of the acoustic tool, presenting its most relevant results and framework analyses for helicopters and UAV quadrotors.

Keywords : rotor noise, acoustic tool, GPU Programming, UAV noise
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