

Structure of the code

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The code is written to calculate the turbulent boundary layer trailing-edge (TE) noise, where the trailing edge can be either straight or serrated. The serration is described by the function $x = hF(y/\lambda)$, where h is the half root-to-tip amplitude and λ is the serration wavelength, and $F(\eta)$ is the periodic shape function of the serration and has a period 1. This code only works for the sawtooth serration. The notations used in the code are consistent with the symbols used in the paper.

The entry point for the code is ‘PredBG.s.m’.

According to the requirements of the paper, the program’s output includes the frequency vector used, the transfer function of the zero-order mode (the mode number can be modified), and the scattered noise PSD obtained by summing the spanwise modes and multiplying by the input turbulent boundary layer wavenumber-frequency spectrum of the flat plate. Chase’s model is used in this code for input TBL spectrum, as in the function ‘ChasePi.m’.

For the sub-functions, ‘Q_n’ corresponds to p_f^n in the paper, ‘Q_01’ corresponds to $p_f^{(01)}$, and so on. ‘Q_in’ represents the Curle integral result for the reflected wave. ‘Q_in2’ represents the approximation of the Curle integral for the incident wave, based on Amiet’s approximation.

The example code pics_program.m should provide some guidance. This version of the pics_program.m provide the ‘BG’ part of pictures in the paper.