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Continuous Wavelet Analysis of a Highly Irregular Roughness Topography for Turbulence Studies YANHUA WU, HUIYING REN, Wright State University — The realistic surfaces encountered in engineering wall-bounded turbulent flows have complex roughness topographies and occupy a wide range of various roughness parameters such as length scales, aspect ratios, and orientation angles, etc. In order to quantify the effects of those roughness parameters of a highly irregular rough surface on the turbulent boundary layers, the present study used continuous Mexican hat and Morlet wavelets to extract the dominant aspect ratio, length scale and orientation of the surface's random roughness elements. The roughness under the current study is replicated from a turbine blade damaged by deposition of foreign materials. For this particular roughness topography, the continuous wavelet analysis reveals that the dominant aspect ratio, length scale and orientation angle are 1/5, 24 mm and 4°, respectively.

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