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Reformulation of the law of the wall for rough surfaces

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Abstract: In the present work, the law of the wall for turbulent flow over rough surfaces is reformulated to take into consideration the effect of roughness elements parameters. The obtained expression for this law of the wall is given. This developed law of the wall fits the experimental results of different works quite well. To show that this updated form of the roughness drag data is suitable for boundary layer computations, this new form of the law of the wall is employed with a developed Reynolds stress turbulence closure to predict both symmetric and asymmetric channel flows. The obtained predictions reveal good agreement with experimental data.