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Linearized boundary conditions at a rough surface[1] PAOLO LUCHINI, Università di Salerno - DIIN — Linearized boundary conditions are a common numerical tool in any flow problems where the solid wall is nominally flat but the effects of small roughness of height ϵ are being investigated. Typical are receptivity problems in aerodynamic transition prediction or turbulent flow control. However, two distinguished mathematical limits have to be considered: a "shallow" limit, where the linearized boundary condition properly applies, involving a family of surfaces that become smoother and smoother as $\epsilon \to 0$, and a "small" limit, more closely representative of usually encountered roughness, whose family of surfaces remain geometrically similar to themselves (in particular, retain their slope) as $\epsilon \to 0$. A connection between the two limits will be established through an analysis of their asymptotic behaviour. As a result, the correct effect of the surface in the "small" limit, obtained through a numerical solution of the Stokes equation, will be recast as an equivalent linearized boundary condition modified by a suitable *protrusion coefficient* (related to the *protrusion height* used years ago in the study of riblets). Quantitative numerical examples of such protrusion coefficients will be provided.

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