Reflections on Lorentz: revisiting image systems for Stokes flows in a half-space WILLIAM MITCHELL, SAVERIO SPAGNOLIE, University of Wisconsin - Madison — Green's functions, whether singular or regularized, have found wide use in the analysis and simulation of viscous flows. In problems where there is a significant hydrodynamic effect from a flat no-slip boundary, an image system is added to the free-space Green's function to obtain a bounded version which vanishes on the wall. We show how the Lorentz reflection theorem may be used to obtain these image systems. This approach is simple and leads to convenient formulas, and moreover generalizes two recent methods for developing wall-bounded flows, one using regularized singularities, and the other using a Papkovich-Neuber potential. A numerical "method of stresslet images" is also discussed and applied to problems in wall-bounded sedimentation and biolocomotion.

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