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A correction scheme for two-way coupled Euler-Lagrange wall-bounded flows PEDRAM PAKSERESHT, Oregon State University, MAHDI ESMAILY, Cornell University, SOURABH V. APTE, Oregon State University — The accuracy of Euler-Lagrange point-particle methods in predicting the drag force reduces when the two phases are two-way coupled owing to the disturbance created by the point-particle force on the background fluid flow. Such disturbance produces an error since the drag closure models often rely on the slip velocity computed based on the *undisturbed* fluid velocity, which is not readily available. Recently few approaches have been developed for retrieving the undisturbed fluid velocity for unbounded flows only, where the disturbance field is not influenced by the no-slip boundary condition on walls. In this work, the correction scheme introduced by Esmaily & Horwitz (JCP, 2018) is extended to wall-bounded flows. It is shown that the newly developed model is generic for all types of flows with and without wall boundaries. The model is tested for a particle settling in a quiescent flow parallel to the wall at different wall distances. It is shown that ignoring the wall effects on correcting the disturbed velocity results in under prediction of settling velocity that is on the same order of magnitude of the uncorrected scheme for particles very close to the wall, underscoring the need for this wall-modified correction for wall-bounded flows.

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