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A two-way coupling scheme to model the effects of particle rotation on the rheological properties of a semidilute suspension

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Highlights

- The effective viscosity is overestimated when the particle's rotation is neglected.
- The effective viscosity varies in time and space with the particles' position.
- The viscosity variation becomes more significant with increasing area fraction.
- The coefficient β of the term quadratic in ϕ is found to be 0.773 for 2D.
- The value of β may increase due to fluid resistance against the particle's rotation.

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