Abstract Submitted
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Exact computation of the scattering length I. SIMBOTIN, Z. PAVLOVIC, R. CÔTÉ, University of Connecticut — We present an approach for the exact computation of the scattering length. Our numerical solution takes into account the full tail of the potential energy $V(R)$, and is thus highly accurate. Our approach is based on a change of variable $x = 1/R$ at a large enough distance R. The short-range propagation of the solution is done as usual (in R), and at $R = R_{\rm mid}$, we switch to the new variable x, which allows to compress the infinite tail into a manageable compact interval for x : $[0, 1]$. This approach is very convenient and can be implemented with almost any existing propagator. We have tested two numerical methods (log-derivative, and an integral-equation based method) against exactly/analytically soluble potentials of Lennard–Jones type. The agreement between the computed and analytical results reaches a relative error of 10^{-12} or better.

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