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Integral representation for scattering phase shifts via the phase-amplitude approach[1] D. SHU, I. SIMBOTIN, R. COTE, Department of Physics, University of Connecticut, Storrs — We obtain a novel integral representation for scattering phase shifts, which is based on a modified version of Milne's phase-amplitude approach [W. E. Milne, Phys. Rev. **35**, 863 (1930)]. We replace Milne's nonlinear differential equation for the amplitude function y with an equivalent linear equation for the envelope $\rho = y^2$, which renders our integral representation highly amenable to numerical implementations. The phase shift is obtained directly from Milne's phase function, which is computed as an integral involving the envelope function; the latter is found as the optimal solution of the envelope equation. We illustrate the advantages of the new representation with two scattering potentials. The integral representation presented in this work is fully general and it can be used for any type of scattering potential, including the Coulomb potential.

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