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Integral equation for electrostatic waves radiated by a point source in a spatially homogeneous magnetized plasma

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Solutions of the linearized Vlasov-Poisson equations for the electric field radiated by a time varying point charge in a three-dimensional, unbounded, spatially homogeneous plasma with a uniform background magnetic field and a uniform (static) flow velocity are expressed in terms of an equivalent integral equation in the time domain. For plasmas characterized by Maxwell distribution functions with isotropic temperatures, the kernel has a relatively simple mathematical form consisting only of elementary functions, exponential and trigonometric functions (sines and cosines), and no infinite sums of Bessel functions. Consequently, the integral equation is amenable to numerical solutions and may be useful for the study of the impulse response of magnetized plasmas and, more generally, the response to arbitrary waveforms.

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