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Evolution of energetic electron distribution due to interaction with chorus emissions

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We perform test particle simulations of energetic electrons interacting with whistler mode chorus emissions. Chorus waves propagate from the geomagnetic equator in both northward and southward directions along the dipole magnetic field. The rapidly increasing frequency and amplitude are determined by model chorus equations. We solve these equations for northward and southward propagating emissions. The source particles are assumed to be located uniformly along magnetic field line, and initial pitch angles are assumed to be 90 degrees. Particles are evenly distributed in gyro-phase, and are assumed to take the form of a delta function in energy. Following interaction with chorus emissions, the calculated distribution function assumes the form of a Green's function. By repeating this process at different energies, we thereby obtain a numerical Green's function as a function of energy. We determine the evolution of the distribution function by the interaction of chorus waves and electrons based on this Green's function method.

Keywords: whistler mode chorus, test particle simulations, Green's function method