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Simulations of Brillouin Scattering in Optical Fibers[1] CARL MUNGAN, U.S. Naval Academy, ELIOT PETERSEN, SHUOCHEN HUANG, JEFFREY WHITE, Army Research Lab — Brillouin scattering arises when a laser beam generates density variations in a medium via electrostriction. The density variations modulate the refractive index, resulting in a grating that Bragg scatters pump light into a Stokes beam. The Stokes wave is downshifted in frequency by the Doppler effect because the grating is moving at the speed of acoustic phonons. To conserve both energy and momentum, the Brillouin photons are backscattered. This back-reflected radiation is a major factor limiting the transmission of laser power in optical fibers for practical applications. It is mathematically described by a set of coupled partial differential equations. I will describe some of the known analytic solutions of these equations, as well as how to find numeric solutions using MATLAB.

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