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Exact solution for permeability of a ferromagnet under parametric bichromatic irradiation ADIL-GERAI KUSSOW, University of Massachusetts, Lowell, Department of Physics, ALKIM AKYURTLU, University of Massachusetts, Lowell, Department of Electrical and Computer Engineering — If two parametrically coupled electromagnetic fields are applied to a ferromagnet, a non-linearity of the equation of precession of magnetic moment strongly affects the permeability. If the coupling constant $|\beta| < 1$ between the probe (p) wave and the support (s) wave is small, the permeability $\hat{\mu}(\omega)$, at the frequency of the probe wave $\omega = \omega_p = 2\omega_s$, is still monochromatic-like, with the re-normalized resonance spin waves frequency $\Omega_r \rightarrow \Omega(1 + \beta)$. If a coupling is strong, $\beta \leq -1$, unusual response effects are possible (the magnetic transparency and profoundly non-monochromatic permeability $\hat{\mu}(\omega)$). Possible optical applications to the homogeneous negative refractive index materials are discussed.

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