

Title: Nonlinear Fourier Analysis

Abstract: A reasonable complex valued periodic function can be written uniquely as a limit of an additive sum of sines and cosines (the sense in which the limit exists is a subtle issue, to be briefly discussed). This is an example of linear Fourier analysis. Now consider an invertible matrix valued periodic function. In this case, provided that a certain determinant is nonzero, the function can be written uniquely as an ordered product of simpler matrices which are analogous to sines and cosines. This is an example of nonlinear Fourier analysis. The usefulness of this product expression is more specialized, so there may be many different versions of this, depending on context.