1171-65-42 **Benjamin Akers*** (benjamin.akers@afit.edu), Air Force Institute of Technology, WPAFB, OH 45433. *Wilton Ripples in Weakly Nonlinear Models: Two existence proofs.*

Nonlinear waves occur in a wide variety of applications, including laser propagation, oceanography, combustion, and more. In special circumstances these waves resonate, resulting in bifurcating solution branches in the nonlinear problem (Wilton ripples). In this talk we consider the asymptotics, existence, and analyticity of these solution branches. Two distinct proofs of existence are discussed: the first is based on a perturbation series, the second is a contraction mapping argument. Both proofs spawn numerical methods. The numerical methods are compared, and results from each are presented. The application of these methods to the spectral stability problem, where resonances occur at eigenvalue collisions, is discussed. (Received August 06, 2021)