数学与系统科学研究院学术报告

报告题目：Determining Resonance Frequencies for a Coupled Ocillator QASER-Laser System by a Fixed Point-Perturbation Approach and Its Generalization to Distributed Parameter Systems

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摘要：

For a linear system with a periodic (time-varying) coefficient, the Floquet theory is applicable. However, the Floquet theory does not offer specific information about the important phenomenon of parametric resonance, for example, for a simple second order differential equation such as the Mathieu equation. Recently, Svidzinsky, Yuan and Scully\* developed a coupled oscillator system with a sine/cosine modulating frequency aimed at some innovative laser designs, acronymed QASER (Quantum Amplification by Superradiant Emission of Radiation). For such a coupled system, it is imperative to understand the parametric frequencies where resonance/amplification happens such that there is output gain. In this talk, the speaker will describe an iteration/perturbative expansion method for pinpointing such resonance frequencies. The proofs are as yet incomplete. The speaker will point out open problems for investigation, and indicate directions of new research for distributed parameter systems such as the wave equation in multidimensional bounded domains with more than a single modulating frequency.