The phase retrieval problem resumes to the reconstruction of a signal given the modulus of its Fourier transform. This problem arises in applications in which the phase is apparently lost or is impractical to measure and only intensity data are available. The phase retrieval problem is related to various applications including antenna design, filter design, image reconstruction, electronic microscopy, and the characterization of astronomical objects. In this talk, we will first review the one- and multi-dimensional phase retrieval problem and the approaches proposed to solve them. Then we will focus on more recent developments concerning the existence of the solution of phase retrieval problem for a given input magnitude data. In case there is no solution from these data, we are looking to solve the problem by oversampling the Fourier measurements.

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