On the randomized Kaczmarz algorithm for phase retrieval

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We consider the problem of phase retrieval, i.e., the problem of recovering an object from a system of quadratic equations. As a method for solving such a phase retrieval problem, we investigate a variant of the randomized Kaczmarz algorithm. The main contribution of our work is a recovery guarantee for phase retrieval from measurements perturbed with additive noise via the randomized Kaczmarz algorithm. We consider the scenario that the measurement vectors are drawn independently and uniformly at random from the unit sphere and that the number of measurements is a sufficiently large multiple of the dimension. We show that, with high probability, the randomized Kaczmarz algorithm converges to a neighborhood around the ground-truth solution whose radius depends on the level of the noise.

This talk is based on joint work with Frank Filbir (Helmholtz Center Munich) and Felix Krahmer (Technical University of Munich).