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Local well-posedness for the Cauchy problem of the Zakharov type system

In this talk, we consider the Cauchy problem of the Zakharov type system. The system has no dispersion in some direction in the usual Zakharov system, so we call it the degenerated Zakharov system. The linear part of the degenerated Zakharov system is more complicated than that of the Zakharov system, so it is difficult to apply directly the local well-posedness result by Ginibre-Tsutsumi-Velo(1997). There are few well-posedness results for this system. The latest result is given by Barros-Linares(2015) for the three dimensional case, and they applied the linear estimate such as the maximal function estimate and the Strichartz estimate. To obtain the local well-posedness result with lower regularity initial data, we apply the Fourier restriction norm method. In this method, the norm of the function space is reflected in the linear part of the equation. Thus, the method is a very powerful tool to recover the derivative loss and we can obtain well-posedness with low regularity initial data. We treat the non-resonant part and the resonant part more carefully than in the case of the Zakharov system because of the lack of dispersion, then we obtain the system is locally well-posed in some anisotropic Sobolev space with low regularity.