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Wei Guo, Department of Mathematics, University of Houston, Houston, TX 77004, and **Jingmei Qiu*** (jingqiu@math.uh.edu), houston, TX 77004. *Super convergence of discontinuous Galerkin method: eigen-structure analysis based on Fourier approach*. Preliminary report.

In the work, we analyze the eigen-structure of the discontinuous Galerkin method for scalar linear conservation laws based on Fourier approach. Especially, we investigate (1) the dispersion and dissipation error of the physically relevant eigenvalue and (2) the eigenvector corresponding to the physically relevant eigenvalues based on Radau points. Based on our investigations, we conclude that the error of the DG solution can be decomposed as two parts. One part is due to the dispersion and dissipation error of eigenvalue; this part of error will grow linearly in time. The other part is due to the difference between the eigenvector and the corresponding waves; the magnitude of this error will not grow in time. This part of error display superconvergence at Radau points. (Received January 18, 2012)