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Bifurcation structure in resistive drift wave turbulence[1] RYUSUKE NUMATA, ROWENA BALL, ROBERT DEWAR, Department of Theoretical Physics, RSPhySE, The Australian National University — In this study, we have analyzed the modified Hasegawa-Wakatani (MHW) model, which describes the electrostatic resistive drift wave turbulence in 2D slab geometry, by direct numerical simulation. We have shown that, at a certain parameter range, a coherent zonal flow structure is generated, and the zonal flow significantly suppresses cross-field turbulent transport. A systematic parameter study of the MHW model has been performed to construct a bifurcation diagram in the parameter space. The result shows that a sudden transition from a zonal flow dominated state to a zonal flow suppressed state occurs if we increase the turbulent drive (the length scale of the background density profile), or decrease the electron adiabaticity (inverse of the parallel resistivity). The zonal flow suppressed rather turbulent state appears in the linearly unstable region.

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