# Contour Dynamics for Vlasov–Poisson Plasma with the Periodic Boundary

*Hiroki Sato[1], Tomo-Hiko Watanabe[1], Shinya Maeyama[1]

1. Nagoya University

Zabusky, Hughes, and Roberts presented a contour dynamics algorithm for the Euler equations of fluid dynamics in two dimensions [1].On the paper, they succeed in calculating time development of contours of vorticity on the x-y plane with the contour dynamics(CD) algorithm, which is a method by using contours of vorticity, piece-wise constant function, and line integrals of Green’ s function on the contours. The CD method does not use underlying lattice, but uses nodes on the contours, and it can lead to more accurate calculation for complex deformation of vorticity.

This method is also applied to Vlasov–Poisson system. In order to study the CD in the Vlasov–Poisson plasma, we have developed a method to implement the periodic of potential and its derivative are satisfied.To check validity of out method, we test the Linear Landau damping by means of the CD scheme.While discretization of the distribution function might lead to some difference from that with continuous distribution, soundness of our new scheme is confirmed in comparison with analytical solutions.

We are also investigating in behaviors of the CD in the continuous limit, and in the nonlinear Landau damping as well.

Reference 1. Contour dynamics for the Euler equations in two Dimensions (1978)

 