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The nonmodal evolution of the instabilities of a Hall plasma driven by a sheared Hall current¹ VOLODYMYR ST. MYKHAYLENKO, VOLODYMYR V. MYKHAYLENKO, HAE JUNE LEE, Pusan National University — A nonmodal kinetic approach to the analysis of the instabilities of a Hall plasma driven by a Hall current with a sheared current velocity is presented. The developed theory predicts that the static spatial structure of the perturbations in the plasma with the inhomogeneous electric field is determined in the frame convected with one of the plasma components. Because of the different shearing of the ion and electrons flows in the Hall plasma, this static mode is observed by the second component as the Doppler-shifted continuously sheared mode with time-dependent wave numbers. Due to this effect, the development of the instabilities driven by the sheared current is the nonmodal process, which is investigated as the initial value problem. The nonmodal solutions for the Hall plasma instabilities of the kinetic and hydrodynamic types are presented.

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