PALADI, F., BARSUK, A. Bifurcation and Stability Analysis of the Equilibrium States in Thermodynamic Systems in a Small Vicinity of the Equilibrium Values of Parameters. in: Journal of Statistical Physics. 2018, Vol. 171 Issue 2, p361-381. ISSN 0022-4715.

The dynamic behavior of thermodynamic system, described by one order parameter and one control parameter, in a small neighborhood of ordinary and bifurcation equilibrium values of the system parameters is studied. Using the general methods of investigating the branching (bifurcations) of solutions for nonlinear equations, we performed an exhaustive analysis of the order parameter dependences on the control parameter in a small vicinity of the equilibrium values of parameters, including the stability analysis of the equilibrium states, and the asymptotic behavior of the order parameter dependences on the control parameter (bifurcation diagrams). The peculiarities of the transition to an unstable state of the system are discussed and the estimates of the transition time to the unstable state in the neighborhood of ordinary and bifurcation equilibrium values of parameters are given. The influence of an external field on the dynamic behavior of thermodynamic system is analyzed and the peculiarities of the system dynamic behavior are discussed near the ordinary and bifurcation equilibrium values of parameters in the presence of external field. The dynamic process of magnetization of a ferromagnet is discussed by using the general methods of bifurcation and stability analysis presented in the pape.