

This thesis deals with the analysis and numerical study of the domain decomposition method based preconditioner for algebraic systems arising from the discontinuous Galerkin (DG) discretization of the linear elliptic problems. We introduce the DG discretization of the model problem. We derive from the properties of the bilinear form the spectral bounds of corresponding forms and matrices. Moreover, we present the Additive Schwarz method and its application as a preconditioner for the system of algebraic equations. We derive the spectral bounds of the preconditioned system of algebraic equations. Finally, we present the numerical results that support the theoretical results and demonstrate the potential of this approach.