abstract: A statistical inference method is developed for a general class of estimators with fewer restrictions. Measuring the uncertainty of estimators, such as asymptotic normality, is a fundamental and standard tool for statistical inference such as a statistical test and a confidence analysis. However, there are several situations that we cannot evaluate its uncertainty, for example, non-differentiable loss functions and parameter spaces as the non-Donsker class. We consider an M-estimator which is defined as an argmax of an empirical mean of criteria functions. Then, we approximate a distribution of the M-estimator by a supremum of a known Gaussian process. For the method, we employ a notion of the high-dimensional Gaussian approximation and apply it to the approximation. We provide a theoretical bound for an error of the approximation. Moreover, we propose a multiplier bootstrap method for statistical inference.