Abstract   Response analysis of structures involving non-probabilistic uncertain parameters can be closely related to optimization. This paper provides a review on optimization-based methods for uncertainty analysis, with focusing attention on specific properties of adopted numerical optimization approaches. We collect and discuss the methods based on nonlinear programming, semidefinite programming, mixed-integer programming, mathematical programming with complementarity constraints, difference-of-convex programming, optimization methods using surrogate models and machine learning techniques, and metaheuristics. As a closely related topic, we also overview the methods for assessing structural robustness using non-probabilistic uncertainty modeling. We conclude the paper by drawing several remarks through this review.