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Special Topic: Advances in Numerical Manifold Method
•Editorial•

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Preface

The numerical manifold method (NMM) is a numerical method pioneered by Genhua Shi in 1991 to approximate continuous-discontinuous (C-D) fields. C-D fields are widespread and involve complex boundaries, moving discontinuities, geometrical uncertainties, etc. Simulating the C-D problems can be quite challenging to the classic finite element method (FEM) using conforming meshes. Generating and updating the meshes to conform to the complex boundaries, moving discontinuities, and uncertain geometries are prohibitive. The concepts developed in NMM, like the splitting of covers, the high-order local functions, and the manifold element with arbitrary shapes, are a great extension and breakthrough of the classical FEM, bringing a unified and consistent formulation for C-D fields. The creative thoughts behind the NMM are also inspiring to consider the new development of numerical methods.

I would like to extend my sincere thanks to Professor Genhua Shi for the opportunity to coordinate this special topic on "Advances in the Numerical Manifold Method". This special topic is primarily dedicated to showcasing the latest advancements and significant applications of the NMM in recent years. The articles included in this issue delve into topics such as high-order heat transfer problems, numerical quadrature methods for manifold elements with polygonal shapes, direct simulation of complex geometries using image models, and the development of the NMM through independent covers. These contributions underscore the impressive capabilities and promising potential of the NMM, and prompt advancements in civil engineering, engineering geology, and allied disciplines.

LI Xu
School of Civil Engineering, Beijing Jiaotong University, Beijing 100044, China