

Topic: Continuum-discontinuum element method

Abstract Key scientific problems confronted in engineering disaster are discussed at first, which indicate that traditional theories such as criterion of “point failure”, crack growth bases on fracture mechanics and plasticity are inadequate to describe the failure process of geological body. Lagrangian equation for continuum-discontinuum element method is introduced, which is a unification of expression for solids, fluid, granular media and fracture problem. The concept of fracture degree in disaster and computational method for fracture degree based on numerical simulation are proposed in engineering scale. And criterion based on strain strength distribution is proposed in the scale of representative volume element (RVE). Failure of RVE is a two-stage process that includes homogeneous damage and localized fracture. Different distributive functions of strain strength are established to describe the process. A fractured-porous coupling model is also introduced. In the end, a serious of engineering examples are demonstrated, which shows that continuum-discontinuum element method has been widely used in various engineering and scientific fields such as slope, blasting, mechanics, mining and tunnel excavation, et al.