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Nota di bibliografia	Includes bibliographical references at the end of each chapters and index.
Nota di contenuto	Introduction -- Discontinuous Explosive Percolation with Multiple Giant Components -- Deriving An Underlying Mechanism for Discontinuous Percolation Transitions -- Continuous Phase Transitions in Supercritical Explosive Percolation -- Unstable Supercritical Discontinuous Percolation Transitions -- Algorithm of percolation models.
Sommario/riassunto	This thesis is devoted to the study of the Bohman-Frieze-Wormald percolation model, which exhibits a discontinuous transition at the critical threshold, while the phase transitions in random networks are originally considered to be robust continuous phase transitions. The underlying mechanism that leads to the discontinuous transition in this model is carefully analyzed and many interesting critical behaviors, including multiple giant components, multiple phase transitions, and unstable giant components are revealed. These findings should also be valuable with regard to applications in other disciplines such as physics, chemistry and biology.