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The magnetic reconnection in 3D solar plasma configuration and it's influence on magnetic helicity

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Magnetic reconnection is a fundamental process in a magnetized plasma for changing the magnetic connectivity of plasma elements and for converting magnetic energy to plasma kinetic energy, heat and fast-particle energy. In Sun's atmosphere it is thought to play a key role in producing solar flares. Here we numerically with a help of 3D-MHD code study the nonlinear evolution of magnetic field reconnection in 3D plasma configuration in the neighborhood of a critical point and influence of magnetic reconnection on magnetic helicity distribution. The special attention is devoted to the case of structurally unstable magnetic field. The transformation of structurally unstable magnetic configurations in structurally stable ones is studied numerically and analytically in the frame of Morse theory.