Braneworld inflation driven by dynamics of a bulk scalar field

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We review a viable alternative scenario of the inflationary universe in the context of the Randall-Sundrum (RS) braneworld. In this scenario, the dynamics of a 5-dimensional scalar field, which we call a bulk scalar field, plays the central role. Focusing on the second (single-brane) RS model, we discuss braneworld inflation driven by a bulk scalar field without introducing an inflaton on the brane. As a toy model, for the bulk scalar field, we consider a minimally coupled massive scalar field in the 5-dimensional spacetime, and look for a perturbative solution of the field equation in the anti-de Sitter background with an inflating brane. For a suitable range of the model parameters, we find a solution that realizes slow-roll inflation on the brane. When the Hubble parameter on the brane and the mass of a bulk scalar field are much smaller than a typical 5-dimensional mass scale, it is found that this proposed inflation scenario reproduces the standard inflation scenario in the 4-dimensional theory.