Noether current from surface term, Virasoro algebra and black hole entropy in bigravity

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The bigravity is non-linear massive gravity which has ghost-free construction with the dynamical metric. This gravity model is called bigravity or bimetric gravity because the model contains two metrics $g_{\mu\nu}, f_{\mu\nu}$ and massive spin-2 field appears in addition to massless spin-2 field corresponding to the graviton. Therefore, by considering the black holes in bigravity, we can evaluate how the massive spin-2 field near horizon affects the black hole entropy. We consider the static, spherically symmetric black hole solutions in bigravity theory for minimal model with a condition $f_{\mu\nu} = C^2 g_{\mu\nu}$ and evaluate the entropy for black holes [1]. In this condition, we show that there exists the Schwarzschild solution for $C^2 = 1$, which is unique consistent solution. We examine how the massive spin-2 field contributes and affects to the Bekenstein-Hawking entropy corresponding to Einstein gravity. In order to obtain the black hole entropy, we use a recently proposed approach which use Virasoro algebra and central charge corresponding to surface term in the gravitational action. As a result, we find that the obtained entropy has a double portion of the Bekenstein-Hawking entropy in the Einstein gravity.