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New parameter estimation method being free from the bias depending on sky region for targeted GW search

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The first direct detection of a GW has been archived. In the next stage, it is important for a GW astronomy and cosmology to observe GW signal all over the sky by the use of global network of the interferometers. Even aLIGO-Virgo-KAGRA network, however, provides biased accuracy of the parameter estimation depending strongly on the sky location of a GW. In order to perform the parameter estimation with the same level of accuracy all over the sky, we propose a novel method based on a regularization method. Although conventional regularization methods couldn't optimize its regulator completely, the new method is developed to optimize full of the regulator parameters. We show our method can improve most of the credible region of inclination vs luminosity distance and polarization vs initial phase over 3 times in the sky where the precision of a GW parameters has deteriorated. This method suppresses the systematic error of a GW depending on the celestial region and enables us more precise analysis of the cosmology.

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