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# Power Law solution for FRW Universe with Observational Constraints

In this study, The power-law solution for an isotropic and homogeneous universe under $f(R,T)$ gravity is examined by taking into account its functional form, $f(R,T) = R + \xi RT$, where $\xi$ is a positive constant. We have constructed the field equation in f(R, T) gravity for homogeneous and isotropic space-time. The solution of the constructed model is given by the $a = \alpha t^{\beta}$. We used the redshift in the $0 \leq z \leq 1.965$ range and obtained the model parameters $\alpha$, $\beta$, $H_0$ using the Markov Chain Monte Carlo method (MCMC). The constrained value of model parameter $H_0 = 65.777^{+2.043}_{-2.171}$ km s$^{-1}$ Mpc$^{-1}$, $H_0 = 66.685^{+2.098}_{-1.765}$ km s$^{-1}$ Mpc$^{-1}$, $H_0 = 67.226^{+1.197}_{-1.172}$ km s$^{-1}$ Mpc$^{-1}$, $H_0 = 66.965^{+2.201}_{-2.020}$ km s$^{-1}$ Mpc$^{-1}$, by bounding the model with H(z) (Hubble parameter) dataset, BAO (Baryon Acoustic Oscillations) dataset, joint H(z) + Pantheon dataset and joint H(z) + BAO + Pantheon dataset respectively. These observational values of derived $H_o$ nicely correspond with the results from the Plank collaboration values. The model is analysed and discussed by studying the behaviour of energy conditions on our achieved solution. We have examined the validity of our model by jerk parameter, Om diagnostic, and statefinder diagnostic tools. Our findings reveal that the present study is consistent with these observations.

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