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A NON-STANDARD COSMOLOGICAL MODEL

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A non-standard cosmological model in Weyl-Cartan spacetime was presented[1]. Within this model the non-Riemannian quantities, i.e. torsion T^α and nonmetricity $Q_{\alpha\beta}$, are proportional to the Weyl 1-form. The hypermomentum $\Delta_{\alpha\beta}$ depends on our ansatz for the nonmetricity and vice versa. In contrast to earlier investigations[2] this model incorporates an additional quadratic nonmetricity term in the gauge Lagrangian, the Lagrangian under consideration reads

$$V_{\text{gauge}} = \tfrac{\chi}{2\kappa} R_\alpha{}^\beta \wedge \eta_\beta{}^\alpha + \sum_{I=1}^{6} a_I \, {}^{(I)}W_\alpha{}^\beta \wedge {}^\star R_\beta{}^\alpha$$
$$+ b\, Z_{\alpha\beta} \wedge {}^\star R^{\beta\alpha} + \sum_{I=1}^{4} c_I \, {}^{(I)}Q_{\alpha\beta} \wedge {}^\star Q^{\beta\alpha}.$$

We derived the explicit form of the field equations for different cases and provided solutions for a broad class of parameters. It was demonstrated that it is possible to construct models in which the non-Riemannian quantities die out with time. We showed how our model fits into the more general framework of metric-affine gravity (MAG)[3]. Additionally, we presented some preliminary results from our search for the best-fit parameters[4] which was performed by using recent type Ia supernova data[5].

References

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