

Bibliography

- [1] M. Velázquez, Ph.D. thesis, Cinvestav, Mexico, 2011.
- [2] U. C. De, A. A. Shaikh, and J. Sengupta, *Tensor Calculus* (Alpha Science, Oxford, 2008).
- [3] M. Nakahara, *Geometry, Topology and Physics* (Institute of Physics, Bristol, 1990).
- [4] C. W. Misner, K. S. Thorne, and J. A. Wheeler, *Gravitation* (W. H. Freeman, San Francisco, 1973).
- [5] S. M. Carroll, *Spacetime and Geometry: An Introduction to General Relativity* (Addison Wesley, San Francisco, 2004).
- [6] J. Plebański, “On the separation of Einsteinian substructures,” *J. Math. Phys.* **18**, 2511, (1977).
- [7] S. Holst, “Barbero’s Hamiltonian derived from a generalized Hilbert-Palatini action,” *Phys. Rev. D* **53**, 5966 (1996); gr-qc/9511026v1.
- [8] R. Capovilla, M. Montesinos, V.A. Prieto and E. Rojas, “BF gravity and the Immirzi parameter,” *Class. Quantum Grav.* **18**, L49 (2001); gr-qc/0102073.
- [9] J. F. G. Barbero, “Real Ashtekar variables for Lorentzian signature space-times”, *Phys. Rev. D* **51**(10), 5507 (1995); gr-qc/9410014v1.

- [10] L. Liu, M. Montesinos, and A. Perez, “A topological limit of gravity admitting an $SU(2)$ connection formulation,” *Phys. Rev. D* **81**, 064033 (2010); e-Print: arXiv:0906.4524 [gr-qc].
- [11] M. Montesinos and M. Velázquez, “BF gravity with Immirzi parameter and cosmological constant,” *Phys. Rev. D* **81**, 044033 (2010); e-Print: arXiv:1002.3836 [gr-qc].
- [12] H. Urbantke, “On integrability properties of $SU(2)$ Yang-Mills fields. I,” *J. Math. Phys.* **25**, 2321 (1984).

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