Notes on Z4c

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Contents

I. DERIVATION

$$\begin{aligned}\Gamma^k{}_{ij} &= \frac{1}{2}\gamma^{kl}(\partial_i\gamma_{jl} + \partial_j\gamma_{li} - \partial_l\gamma_{ij}) \\ &= \frac{1}{2}\tilde{\gamma}^{kl}\left[(\partial_i\tilde{\gamma}_{jl} - \partial_i \ln\chi\tilde{\gamma}_{jl}) + (\partial_j\tilde{\gamma}_{li} - \partial_j \ln\chi\tilde{\gamma}_{li}) - (\partial_l\tilde{\gamma}_{ij} - \partial_l \ln\chi\tilde{\gamma}_{ij})\right] \\ &= \tilde{\Gamma}^k{}_{ij} - \frac{1}{2}(\partial_i \ln\chi\delta^k{}_j + \partial_j \ln\chi\delta^k{}_i - \tilde{\gamma}_{ij}\tilde{\gamma}^{kl}\partial_l \ln\chi)\end{aligned}$$

where $\partial_l\gamma_{ij} = \partial_l(\chi^{-1}\tilde{\gamma}_{ij}) = \chi^{-1}(\partial_l\tilde{\gamma}_{ij} - \chi^{-1}\partial_l\chi\tilde{\gamma}_{ij}) = \chi^{-1}(\partial_l\tilde{\gamma}_{ij} - \partial_l \ln\chi\tilde{\gamma}_{ij})$.

II. MORE

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[1] Roger Alexander. Solving ordinary differential equations i: Nonstiff problems (e. hairer, sp norsett, and g. wanner). Siam Review, 32(3):485, 1990.

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