

广义相对论框架中的 IAU 时间尺度和参考系

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摘 要

简要地回顾和介绍了 IAU 时间尺度和参考系的历史和进展, 其主要内容包括: (1) 牛顿时空观和相对论时空观; (2) IAU 各种时间尺度的历史演变和相互关系; (3) IAU 的天文参考系, 有关的最新决议, 相对论框架下度规及其规范问题, 四维时空中的完全 1PN 坐标变换。也介绍了一些有关工作, 阐明了与 IAU 最新决议稍有不同观点, 指出了目前 IAU 有关决议可能仍存在某种程度上的不完善。

关键词 相对论 — 天文参考系 — 时间尺度

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The IAU Time Scales and Reference Systems in the Framework of General Relativity

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Abstract

This paper briefly retrospects and introduces the history of the IAU time scales and reference systems, and especially some new progress. It mainly includes that: (1) Newtonian and relativistic spacetime outlook; (2) the historical development of the IAU time scales and their interrelations; (3) the IAU astronomical reference systems, the related new resolutions, the metric and its gauge problem in the relativistic framework, the fully 1PN coordinate transformation in 4-dimensional spacetime. Besides, some of our related results are also introduced. We present slightly different points of view with the newest IAU resolutions, and point out that the related IAU resolutions, in a sense, are probably not perfect.

Key words relativity—astronomical reference systems—time scales