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论文

天体运行轨道的背景介质理论导引与自相似分形测度计算的分维微积分基础

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摘要 通过讨论天体运行背景介质理论的连续轨道及离散轨道这二个研究方向的基础假设，介绍了天体运行轨道的具体方程形式及理论框架概要；进一步地通过讨论天体运行轨道Binet方程的一般形式及其行星近日点进动角的解，给出了连续轨道理论与Newton理论及Einstein广义相对论的联系与区别；通过讨论天体运行轨道的分维扩展方程，给出了包括太阳系行星、天王星卫星、地球卫星、绕月航天器等在内的离散轨道（稳定性轨道）方程及其预言数据.特别地，作为对天体在较为广泛区域作用曲线的初步探讨推论，指出仅由天体引力难以形成质量密度趋于无穷大的理想黑洞.通过讨论一般函数的分维导数的位置假设及幂函数的分维导数的形式假设，进一步明晰了幂函数的分维导数、分维微分及分维积分的具体方程形式，给出分维导数与分数阶导数的区别，随后讨论了基于一般分形测度的分维微积分形式定义导出的自相似分形的测度计算方程具体形式，给出了其与目前Hausdorff测度方法（覆盖方法）的区别，并对包括三分Cantor集合、Koch曲线、Sierpinski垫片及正交十字星形等自相似分形在内的测度进行了计算分析.

关键词 天体运行轨道 背景介质理论 连续轨道 离散轨道 自相似分形测度 分维微积分 分维导数

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Introduction on background medium theory about celestial body motion orbit and foundation of fractional-dimension calculus about self-fractal measure calculation

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Abstract In this paper, by discussing the basic hypotheses about the continuous orbit and discrete orbit in two research directions of the background medium theory for celestial body motion, the concrete equation forms and their summary of the theoretic frame of celestial body motion are introduced. Future more, by discussing the general form of Binet's equation of celestial body motion orbit and it's solution of the advance of the perihelion of planets, the relations and differences between the continuous orbit theory and Newton's gravitation theory and Einstein's general relativity are given. And by discussing the fractional-dimension expanded equation for the celestial body motion orbits, the concrete equations and the prophesy data of discrete orbit or stable orbits of celestial bodies which included the planets in the Solar system, satellites in the Uranian system, satellites in the Earth system and satellites obtaining the Moon obtaining from discrete orbit theory are given too. Especially, as the preliminary exploration and inference to the gravitation curve of celestial bodies in broadly range, the concept for the ideal black hole with trend to infinite in mass density difficult to be formed by gravitation only is explored. By discussing the position hypothesis of fractional-dimension derivative about general function and the formula form the hypothesis of fractional-dimension derivative about power function, the concrete equation formulas of fractional-dimension derivative, differential and integral are described distinctly further, and the difference between the fractional-dimension derivative and the fractional-order derivative are given too. Subsequently, the concrete forms of measure calculation equations of self-similar fractal obtaining by based on the definition of form in fractional-dimension calculus about general fractal measure are discussed again, and the differences with Hausdorff measure method or the covering method at present are given. By applying the measure calculation equations, the measure of self-similar fractals which include middle-third Cantor set, Koch curve, Sierpinski gasket and orthogonal cross star are calculated and analyzed.

Key words orbit of celestial body motion; background medium theory; continuous orbit; discrete orbit; self-similar fractal measure; fractional-dimension calculus; fractional-dimension derivative

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