

Contributed Talk

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Title: Calculation of multipole moments of axistationary electrovacuum spacetimes

Abstract: The multipole moments expansion in General Relativity was introduced in the '70s by Geroch (Hansen) for asymptotically flat static (stationary) spacetimes. For stationary axially symmetric (electro-)vacuum spacetimes, the multipole moments can be expressed in terms of the power series expansion coefficients of the Ernst potential on the axis. Although Geroch and Hansen have given a well-posed definition of the multipole moments in GR, it was only after Fodor, Hoenselaers and Perjés introduced an algorithm to evaluate the momenta that it became practical to use them to characterize new solutions. In this talk, I will present a simpler, more efficient calculation of the multipole moments, applying methods introduced by Bäckdahl and Herberthson. For the non-vacuum electromagnetic case, our results for the octupole and higher moments differ from the results already published in the literature. The reason for this difference is that we correct an earlier unnoticed mistake in the power series solution of the Ernst equations.