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## **Einstein-Maxwell-Dilaton-Axion mass formulas for black hole systems with struts and strings**

*Tuesday, 6 July 2021 09:00 (30 minutes)*

We derive Smarr-type mass formulas for black holes solutions with non-connected horizons, represented by their rod structure, in the framework of the EMDA theory, generalizing the results of the recent paper “On the Smarr formulas for electrovac spacetimes with line singularities - ScienceDirect”. Our formalism covers such configurations as aligned multiple black holes joined by struts and possibly by Misner and Dirac strings when the individual components are endowed with magnetic mass or monopole charges. It is shown, that the axion and dilaton fields only modify the expressions for the electric and magnetic charges, but do not introduce new terms into the mass formulas. We discuss the thermodynamic interpretation of solutions with Misner and Dirac strings and discuss the relationship with previous literature on Misner string.

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