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Charging axisymmetric space-times with cosmological constant

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Ernst's solution generating technique for adding electromagnetic charge to axisymmetric space-times in general relativity is generalised in presence of the cosmological constant. Ernst equations for complex potentials are found and they are traced back to an effective dual complex dynamical system, whose symmetries are studied. In particular this method is able to generate charged, asymptotically (A)dS black holes from their uncharged version: as an example, it is shown explicitly how to pass from the Kerr-(A)dS to the Kerr-Newman-(A)dS metric. A new solution describing a magnetic universe in presence of the cosmological constant is also generated.