

On generalized Melvin's solution corresponding to the Lie algebra E_6

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A multidimensional generalization of Melvin's solution (originally describing the gravitational field of a magnetic flux tube in four dimensions) is considered. Being defined in D -dimensional spacetime, the generalized solution is also related to an arbitrary simple Lie algebra $calG$ corresponding to some hidden symmetries of the master equations of the model. The gravitational model contains n 2-forms and $l \geq n$ scalar fields, where n is the rank of $calG$. The solution is governed by a set of n functions $H_s(z)$ obeying n ordinary differential equations with certain boundary conditions imposed. It was conjectured earlier that these functions should be polynomials (the so-called fluxbrane polynomials). The polynomials $H_s(z)$, $s = 1, \dots, 6$, for the Lie algebra E_6 are obtained and a corresponding solution for $l = n = 6$ is presented. The polynomials depend on integration constants Q_s . They obey symmetry and duality identities. The latter ones are used in deriving asymptotic relations for solutions at large distances. The power-law asymptotic relations for E_6 -polynomials at large z are governed by integer-valued matrix $\nu = A^{-1}(I + P)$, where A^{-1} is the inverse Cartan matrix, I is the identity matrix and P is permutation matrix, corresponding to a generator of the Z_2 -group of symmetry of the Dynkin diagram. The 2-form fluxes Φ^s are calculated.

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