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Gauged D=4 N=4 Supergravity

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We present the full Lagrangian and local supersymmetry transformation rules for the gauged D=4, N=4 (half-maximal) supergravity coupled to an arbitrary number of vector multiplets. Using the embedding tensor formulation, the final results are universal and valid in an arbitrary symplectic frame. We also derive the conditions satisfied by the critical points of the scalar potential and we specify the mass matrices of all the fields in the theory for Minkowski vacua that completely break N=4 supersymmetry. Furthermore, we show that the supertrace of the squared mass eigenvalues vanishes for all such vacua of any gauged D=4, N=4 supergravity irrespective of the number of vector multiplets and the choice of the gauge group, which implies the absence of quadratic divergences in the 1-loop effective potential for this class of vacua. We also provide some interesting byproducts of our analysis, such as the field equations and the quadratic constraints satisfied by the fermion shifts characterizing the gauging (also known as T-tensor identities).

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