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Holographic Weyl Anomaly in 8d from General Higher Curvature Gravity

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We calculate the holographic central charges for general higher curvature gravity theory dual to eight dimensional CFT. To do this, we first elaborate the general form of Weyl anomaly in 8d CFT and find 11 non-trivial linearly independent curvature combinations, one of which is Euler density and the rest are Weyl invariants, including 7 non-differentiated ones and 3 differentiated ones. The Weyl invariants are constructed as invariant polynomials of curvature tensor and covariant derivatives. We denote $W_{(n)}$ as the Weyl invariant that contains a polynormial term with a minimum of n curvature tensors. Interestingly, since there are a total of 12 Weyl invariants in 8d, our finding means two of them are trivial and expressible as total derivatives. The resulting central charges are expressed in terms of 15 theory-dependent constants. Remarkably, we find that the $W_{(2)}$ invariant corresponds to the c-charge that is proportional to C_T, while the two $W_{(3)}$'s are related to three-point function parameters of energy-momentum tensor. This suggests a possible connection between the c-charges of $W_{(n)}$'s and the n-point functions of energy-momentum tensor.

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