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Mock modularity of Calabi-Yau threefolds

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Generating functions h(τ) of D4-D2-D0 BPS indices, appearing in Calabi-Yau compactifications of type IIA string theory and identical to rank 0 Donaldson-Thomas invariants,are known to be higher depth mock modular forms satisfying a specific modular anomaly, with depth dtermined by the D4-brane charge r. We develop a mmethod to solve the modular anomaly equation for arbitrary charges, in terms of indefinite theta series. This allows to find the generating functions up to modular forms that can be fixed by computing just a finite number of Fourier coefficients of h.

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