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Sextic tensor field theories

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Tensor models admit a melonic large N limit. In d dimensions, they give rise to a new family of conformal field theories. Such melonic CFTs were studied for tensor models in rank 3 with quartic interactions. However, a non-trivial infrared fixed point with a real spectrum of conformal dimensions was only found for a model with a long-range propagator and a purely imaginary coupling constant. We wish to understand how this depends on the rank of the tensors and on the order of the interactions. I will present here the renormalization group flow of two tensor models with sextic interactions in rank 3 and 5 with either short or long-range propagators. In rank 3, we found non-trivial IR fixed points for both the short-range and the long-range models, with precursors at next-to-leading order in short range. We also found a real spectrum of bilinear operators in both cases. Surprisingly, in rank 5, we only found a non-interacting fixed point.

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