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Hessian and graviton propagator of the proper vertex ATOUSA CHAHARSOUGH SHIRAZI, JONATHAN ENGLE, ILYA VILENSKIY, Florida Atlantic University — The proper spin-foam vertex amplitude was obtained from the EPRL vertex by projecting out all but a single gravitational sector, in order to enable correct semi-classical behavior. In this paper we calculate the gravitational two-point function predicted by the proper spin-foam vertex to lowest order in the vertex expansion. We find the same answer as in the EPRL case, so that the theory is consistent with the predictions of linearized gravity in the regime of small curvature. The method for calculating the two-point function is again to cast it in terms of an action integral and to use stationary phase methods. Thus, the calculation of the Hessian matrix plays a key role. Once the Hessian is calculated, it is used not only to calculate the two-point function, but also to calculate the coefficient appearing in the semi-classical limit of the proper vertex amplitude itself. This coefficient can be thought of as the effective discrete "measure factor" encoded in the spin-foam model.

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