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Mandelstam's "Quantization of the Gravitational Field" revisited JORGE PULLIN, Louisiana State Univ - Baton Rouge, RODOLFO GAMBINI, MIGUEL CAMPIGLIA, Universidad de la Republica, Uruguay — In the 1960's Mandelstam pioneered an approach to the quantization of gauge fields and gravity based on loop-dependent Dirac observables. In the gravitational case, space-time points became an emergent entity. Although some limited success in the computation of graviton propagators was achieved, the formalism proved unwieldy, in particular making it very difficult to characterize if two curves ended in the same point. We note that the use of techniques of the group of loops, in particular the loop and connection derivative, allow to overcome these technical difficulties, opening new possibilities for the quantization of gravity. We construct a path dependent action and show it is equivalent to the Einstein–Hilbert one.

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