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Geometry of metal-insulator transitions in one-dimension NOAH BRAY-ALI, University of Southern California, LORENZO CAMPOS VENUTI, Quantum Information Group, Institute for Scientific Interchange (ISI), Viale Settimio Severo 65, I-10133 Torino, Italy, MARCO COZZINI, Dipartimento di Fisica, Politecnico di Torino, Corso Duca degli Abruzzi 24, I-10129 Torino, Italy, Quantum Information Group, Institute for Scientific, PAOLO ZANARDI, Quantum Information Group, Institute for Scientific Interchange (ISI), Viale Settimio Severo 65, I-10133 Torino, Italy, Univ. of Southern Califor. — We use the geometric approach to quantum critical points to study the metal-insulator transitions driven by chemical potential, μ, or repulsion, U, in the one-dimensional Hubbard model. The transition to the band-insulator, as $\mu \to \mu_c$, exhibits conventional scaling of the ground-state fidelity metric tensor $G_{\mu,\nu} \equiv \mathrm{Re}\left[\langle\partial_\mu\psi|\partial_\nu\psi\rangle - \langle\partial_\mu\psi|\psi\rangle\,\langle\psi|\partial_\nu\psi\rangle\right]$. For example, the metric diverges as $G_{U,U} \sim 1/n$, where, $n \sim \sqrt{\mu - \mu_c}$, is the band filling. At the Mott transition, the metric behavior depends on the path of approach to the critical point.

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