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**Benjamin Eichinger, Tom VandenBoom\*** (tv4@rice.edu) and **Peter Yuditskii**. *The KdV hierarchy via Abelian coverings and operator identities.*

We establish precise spectral criteria for potential functions  $V$  of reflectionless Schrödinger operators  $L_V = -\partial_x^2 + V$  to admit solutions to the Korteweg de-Vries (KdV) hierarchy with  $V$  as an initial value. More generally, our methods extend the classical study of algebro-geometric solutions for the KdV hierarchy to noncompact Riemann surfaces by defining generalized Abelian integrals and analogues of the Baker-Akhiezer function on infinitely connected domains with a uniformly thick boundary satisfying a fractional moment condition. (Received January 31, 2018)