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Convex spectral functions of compact operators

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Abstract We consider functions on the space of compact self-adjoint Hilbert space operators. Specifically, we study those extended-real functions which depend only on the operators' spectral sequences. Examples include the norms of the Schatten p-spaces, the Calderón norms, the k'th largest eigenvalue, and some infinite-dimensional self-concordant barriers. We show how various convex and non-smooth-analytic properties os such functions follow from the corresponding properties of the restrictions to the space of diagonal operators, and we derive sub-differential and conjugacy formulas.