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Review: On rank one perturbations of complex symmetric operators

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On rank one perturbations of complex symmetric operators. (English summary)

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Let $\mathcal{H}$ denote a separable, complex Hilbert space. A bounded linear operator $T:\mathcal{H}\to\mathcal{H}$ is a *complex symmetric operator* (CSO) if there is a conjugation $C:\mathcal{H}\to\mathcal{H}$ so that $T=CT^*C$ (a *conjugation* is a conjugate-linear, isometric involution). One says that T is *decomposable* if for every open cover $\{U,V\}$ of $\mathbb{C}$, there are T-invariant subspaces $\mathcal{X}$ and $\mathcal{Y}$ so that $\mathcal{H}=\mathcal{X}+\mathcal{Y}$, $\sigma(T|_{\mathcal{X}})\subseteq\overline{U}$, and $\sigma(T|_{\mathcal{Y}})\subseteq\overline{V}$. The authors study the decomposability of rank-one perturbations of CSOs. They also investigate conditions under which such a perturbation is hyponormal or satisfies the a-Weyl theorem. They study several instructive examples based on shift operators and truncated Toeplitz operators. *Stephan R. Garcia*