

## **Spectral properties of unbounded $J$ -self-adjoint block operator matrices**

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We consider unbounded block operator matrices of the form

$$\begin{pmatrix} A & B \\ -B^* & D \end{pmatrix}$$

in the direct sum of two Hilbert spaces where  $A$  and  $D$  are self-adjoint operators, bounded from below and from above, respectively, and  $B$  is closed. Under two different relative boundedness assumptions (upper dominant and diagonally dominant cases) the spectrum of the block operator matrix is discussed. The Schur complement and the quadratic numerical range are used to find conditions for the spectrum to be real and to establish variational principles for eigenvalues and eigenvalues estimates. The results are applied to block operator matrices that are connected with differential operators that depend rationally on the eigenvalue parameter.

The talk is based on joint work with Michael Strauss.