Manifold of proper elements

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Let X be a Banach space and let $B(X)$ denote the space of all bounded linear transformation on X. With

$$Eig(X) = \{(\lambda, L, A) \in \mathbf{C} \times P_1(X) \times \mathcal{B}(X) : A(L) \subset L \text{ and } A_{|L} = \lambda I\}$$

we denote the *manifold of proper elements of* X and let $(\lambda_0, L_0, A_0) \in Eig(X)$ be a fix arbitrary element. In the first part of this note we give necessary and sufficient conditions that $(\lambda, L, A) \in Eig(X)$ using the system of equations determinate with $(\lambda_0, L_0, A_0) \in Eig(X)$. In the second part we apply this result to describe relation between multiplicity of eigenvalue λ_0 of the operator A_0 and the spectrum of the operator $\widehat{A_0}$ from quotient X/L_0 to itself definite with $\widehat{A_0}(x + L_0) = A_0(x) + L_0$.