



Math for the people, by the people.

spectrum of $A - \mu I$

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Let A be an endomorphism of the vector space V over a field k . Denote by $\sigma(A)$ the spectrum of A . Then we have:

Theorem 1.

$$\sigma(A - \mu I) = \{\lambda - \mu : \lambda \in \sigma(A)\}$$

Theorem ?? is equivalent to:

Theorem 2. λ is a spectral value of A if and only if $\lambda - \mu$ is a spectral value of $A - \mu I$.

Proof of Theorem ??. Note that

$$A - \lambda I = (A - \mu I) - (\lambda I - \mu I) = (A - \mu I) - (\lambda - \mu)I$$

and thus $A - \lambda I$ is invertible if and only if $(A - \mu I) - (\lambda - \mu)I$ is invertible. Equivalently, λ is a spectral value of A iff $\lambda - \mu$ is a spectral value of $(A - \mu I)$, as desired. \square