Linear Vector Spaces with Indefinite Metric.

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ERRATUM

In the paper with the above title there is a mathematical error on page 171. In the case a real eigenvalue p of a self adjoint operator P occurs as a non-simple root of the minimum polynomial $m(\lambda)$ of P ,

$$m(\lambda) = (\lambda - p)^k \cdot q(\lambda), \quad q(p) \neq 0, \quad k > 1,$$

we say that *every* eigenvector χ of P , corresponding to this eigenvalue p , must have the representation

$$\chi = (P - pI)^{k-1} \varphi,$$

where φ is a suitable non-zero vector. This statement is wrong. The error lies in concluding that

$$(P - pI)\chi \neq (P - pI)^k \varphi, \quad (\text{for any } \varphi),$$

if

$$\chi \neq (P - pI)^{k-1} \varphi, \quad (\text{for any } \varphi).$$

This is wrong since $(P - pI)$ is a *singular* operator.

Thus the correct statement is that, in the case considered, *at least one* (and not every) eigenvector χ has the representation

$$\chi = (P - pI)^{k-1} \varphi,$$

with a suitable φ , and hence

$$\|\chi\| = 0.$$

Other eigenvectors may or may not have norm zero.

In the special case of two dimensions our conclusion and its applications (Sect. 2, § 1, 3) later remain unchanged, since in this case when a self-adjoint operator is non-diagonalizable, it has only one eigenvector and so it must be the one with norm zero.

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