Abstract

As part of more results from my recent PhD thesis titled: Geometric algebra via sheaf theory: A view towards symplectic geometry, which serves as a corner stone for Abstract Geometric Algebra and this paper, and building on prior joint works done by Mallios and Ntumba, we study Sylvester’s Theorem via sheaf theory. Given a Riemannian $\mathcal{A}$-module $\mathcal{E}$ equipped with an $\mathcal{A}$-metric $\phi$ that is a symmetric and orthogonally convenient pairing over an ordered algebraized space $(X, \mathcal{A})$. Then $\phi$ is $\mathcal{A}$-isometric to $r[1] \perp s[-1]$. Thus, the number $r$ is invariant and it does not, in general, describe the geometry of $\mathcal{E}$ completely. It does so, however, in one important case, which is when every element of $\mathcal{A}$ is a square of an element of $\mathcal{A}$. This holds, for instance, if $\mathcal{A} := \mathcal{P} \cup -\mathcal{P}$, the ordered PID $\mathbb{R}$-algebraized space. There is an analog of this result in the setting of vector spaces. (Received July 15, 2011)