Sesquilinear versus bilinear - what is the real scalar product?

C. Mehl

Indefinite inner products arise in many applications - real or complex. But, when generalizing real indefinite inner products (i.e., bilinear symmetric forms) to the complex case, then one could consider either sesquilinear forms or bilinear forms. Which generalization is more natural? We will answer this question in terms of canonical forms and, in particular, we will see that the answer is not as direct as one may think.