On decompositions
of nonnegative sesquilinear forms

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There are a lot of objects in analysis that induce nonnegative sesquilinear forms in a very natural way. For example, (finite) measures on σ-algebras, bounded positive operators on Hilbert spaces, positive linear functionals on (Banach) *-algebras, positive definite operator functions on *-semigroups, and so on. In my talk I will present two different decomposition theorems for nonnegative sesquilinear forms. These are the so-called Lebesgue-type decomposition [1] and the short-type decomposition [2]. Among others, it turns out that the Lebesgue decomposition of measures and the short of bounded positive operators have a common root [3]. As an application, I will present an elementary functional analytic proof for the classical theorem.

[1] Z. Sebestyén, Zs. Tarcsay, T. Titkos, Lebesgue decomposition theorems, *Acta Sci. Math. (Szeged)* **79** (2013), 219–233.

[2] Z. Sebestyén, Zs. Tarcsay, T. Titkos, A short-type decomposition of forms, *Submitted manuscript.*

[3] T. Titkos, A simple proof of the Lebesgue decomposition theorem, http://arxiv.org/pdf/1404.1871v1.pdf