

## Some new results about the convergence of sequences of positive linear operators and functionals

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The talk will be devoted to report some recent results which have been established in [1] and [2] and which are concerned with the study of the limit behaviour of the sequences of the positive linear functionals and operators associated with integrated generalized means defined with respect to a given probability Borel measure on a Borel convex subset of a Hilbert space.

The main results are easily achieved through some new Korovkin-type theorems for composition operators and for functionals which are established in the context of function spaces defined on a metric space.

Several applications are showed in the special cases of bounded and unbounded real intervals which involve the most common integrated means. Furthermore, some consequences concerning the convergence in distribution, and hence stochastically, of generalized means of vector-valued random variables are also presented.

The final part of the talk will be addressed to discuss some applications to the so-called box integral problem, i.e., the problem to evaluate the limit behaviour as  $n \rightarrow \infty$  of the average distance between two points of  $[0, 1]^n$  randomly chosen according to a given distribution on  $[0, 1]^n$  ([3]).

### References

- [1] F. Altomare, *On the convergence of sequences of positive linear operators and functionals on bounded function spaces*, Proc. Amer. Math. Soc. **149** (2021), no. 9, 3837 - 3848.
- [2] F. Altomare, *On positive linear functionals and operators associated with generalized means*, J. Math. Anal. Appl. **502** (2021) 125278.
- [3] G. Herzog and P. C. Kunstmann, *Korovkin's theorem for functionals and limit for box integrals*, Amer. Math. Monthly **126** (2019), no. 5, 449–454.