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Random linear operators arising from piecewise linear interpolation on the unit interval

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SUMMARY

We introduce a sequence of random linear operators arising from piecewise linear interpolation at a set of random nodes on the unit interval. We show that such operators uniformly converge in probability to the target function, providing at the same time rates of convergence in terms of the Ditzian-Totik modulus of smoothness. Analogous results are shown for their deterministic counterparts, derived by taking expectations of the aforementioned random operators. Special attention is paid to the case in which the random nodes are the uniform order statistics. This allows us to compare the speed of convergence in the case at hand with that concerning the random and the deterministic Bernstein polynomials.

Keywords: random linear operator, random Bernstein polynomials, uniform convergence in probability, Ditzian-Totik modulus of smoothness, uniform order statistics.

AMS Classification: 41A25, 60E05

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