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On the Error of Approximation by Means of Scenario Trees with Depth 1

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Let Λ_n denote the set of scenario trees with depth 1 and n scenarios. Let $X = (0 \le x_1 < \ldots < x_n \le 1)$ and let $\Lambda_n(X)$ denote the set of all scenario trees of depth 1 with the scenarios $X = (0 \le x_1 < \ldots < x_n \le 1)$. Let G be a probability distribution defined on $[0, 1]$ and H be a subset of measurable functions defined on $[0, 1]$. Let $d_{H,X}(G) = \inf_{\tilde{G} \in \Lambda_n(X)} d_H(G, \tilde{G})$ and $d_H(G) = \inf_{\tilde{G} \in \Lambda_n} d_H(G, \tilde{G})$, where $d_H(G, \tilde{G}) := \sup_{h \in H} \left| \int h\, dG - \int h\, d\tilde{G} \right|$. The main goal of the paper is to estimate $d_H(G, X)$ and $d_H(G)$ in the case when the set H is a subset of all algebraical polynomials of degree $\le n$. Thus, the paper is examined the error of approximation of a continuous distribution G by means of scenario trees with depth 1 and matching the first n moments.

Key words: scenario trees, method of moments.

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