Consider a sample of size $n$ in which the observed values are $x_1, x_2, \cdots, x_n$, and let $(n - 1)\delta^2 = \sum_{i=1}^{n-1}(x_{i+1} - x_i)^2$. The authors have studied the sampling theory of $\delta^2$ assuming the elements in the sample to have been independently drawn from a normal population with known variance $\sigma^2$. The first four moments of $\delta^2$ are determined, and a Pearson Type VI curve is fitted to the distribution of $\delta^2/\sigma^2$. The values of the constants for the fitted curves are given for $n = 5, 7, 10, 15, 20, 25, 50$ and a comparison is made in each case between the true $\beta_2$ and the $\tilde{\beta}_2$ of the fitted curve.

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