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A Computer Proof of Turán's Inequality

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Abstract: We show how Turán's inequality $P_n(x)^2 - P_{n-1}(x)P_{n+1}(x) \geq 0$ for Legendre polynomials and related inequalities can be proven by means of a computer procedure. The use of this procedure simplifies the daily work with inequalities. For instance, we have found the stronger inequality $|x|P_n(x)^2 - P_{n-1}(x)P_{n+1}(x) \geq 0$, $-1 \leq x \leq 1$, effortlessly with the aid of our method.



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