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On the sum-product problem. Preliminary report.

An old conjecture of Erdős and Szemerédi states that if A is a finite set of integers then the sum-set or the product-set should be large. The sum-set of A is $A + A = \{a + b | a, b \in A\}$, and the product set is defined in a similar way, $A \cdot A = \{ab | a, b \in A\}$. Erdős and Szemerédi conjectured that the sum-set or the product set is almost quadratic in the size of A , i.e. $\max(|A + A|, |A \cdot A|) \geq c|A|^{2-\delta}$ for any positive δ . In this talk we review some recent developments on this conjecture. (Received February 03, 2009)