# Periods and $L$-functions

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## Abstract

Already Euler computed the values $\zeta(2), \zeta(4), \zeta(6), \ldots$ of the Riemann zeta function $\zeta(s) = \sum_{n=1}^{\infty} \frac{1}{n^s}$ to be

$$\zeta(2k) = -\frac{(2\pi i)^{2k}}{2(2k!)} B_{2k}$$

where $B_{2k} \in \mathbb{Q}$ are the Bernoulli numbers. This formula can be seen as the easiest case of a vast conjecture by Deligne from 1977, which relates special values of $L$-functions of arithmetic varieties and their periods.

In this talk we want to give a non-technical introduction to the Deligne conjecture, aimed at general mathematical audience. In the end we discuss very recent developments, which lead to a complete proof in the case of Hecke $L$-functions.