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Explicit study of modular forms

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$\{A(T)\}$: Sequence

↓↑

$\mathrm{F}(\mathrm{Z}) = \sum_T A(T) e^{2\pi i\, tr(TZ)}$

: Fourier series (modular form)

↓↑

$\mathrm{D}(\mathrm{s}) = \sum_T \frac{A(T)}{|T|^s}$

: Dirichlet series (analytic continuation and functional equation)

Find new unexpected interplay and their applications (complementary each other)

Content:

Objects

To study modular forms and its Dirichlet series. Namely, I am interested in their interplay and applications complementary each other.

Motivation

Arithmetic nature of the Fourier and Dirichlet coefficients.

Accordingly, I am interested in several aspects of modular forms.

Sales points

(1) explicit computations as far as possible

(2) use of analysis (integral transforms, special functions and harmonic analysis) to get arithmetic consequence

(3) including higher degree case

(4) familiarity with Eisenstein series

Keywords : modular forms, Dirichlet series

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