



Quantum Modular Forms

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Motivation

Modular Forms

- The Modular Group is $\mathrm{PSL}_2(\mathbb{Z}) = \mathrm{SL}_2(\mathbb{Z}) / \{\pm \mathbb{I}\}$ which acts as $\begin{pmatrix} a & b \\ c & d \end{pmatrix} z = \frac{az+b}{cz+d}$ on $z \in \mathbb{C} \cup \{\infty\}$.
- A modular form is a holomorphic function on $H(\text{upper half complex plane}) \cup \{\infty\}$ transforming under the modular group as $f(z) = (cz + d)^{-2k} f(gz) \quad \forall g \in \mathrm{SL}_2(\mathbb{Z})$.

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Lie Groups