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Mathieu equation as a confluent Heun equation and its applications

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Mathieu equation appears in different fields of physics and usually it's known as Schrodinger equation with cosine as potential but in more general sense it's a certain specification of confluent Heun equation. Heun equation is a second order ordinary differential equation with rational coefficients, with four regular singular points. Without loss of generality we can put these points in $1, 0, t, \infty$. In our work we consider Mathieu equation and confluent Heun equations and their connection with classical conformal blocks.

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