

## Connection formulas for Heun functions

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The Heun differential equation is a second order differential equation with four regularities at  $0$ ,  $1$ ,  $a$  and  $\infty$ . At each singularity a pair of solutions of Heun's equation are given in the form of Fuchs-Frobenius power series. Given one of the four singularities, the pair of solutions can be expressed as a linear combination of the solutions defined at a nearby singularity, and the problem of connection formulas is to determine the coefficients in this linear combination. We shall show that the connection formulas are related to the asymptotic approximation of a second-order difference equation, and some partial results on the connection formulas will be presented.

This is a joint work with Wengao Long and Yuqiu Zhao (both from Sun Yat-sen University).