Asymptotic analysis for a confluent KZ type equation

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Abstract: We are interested in the asymptotic analysis of integrable connections of irregular singular type in several variables. Majima (LNM 1075, Springer, 1984) gave a fundamental idea of asymptotic expansion in several variables, and developed a general theory. However, there seems no essential example where Majima's asymptotic expansion is calculated. The asymptotic analysis in several variables seems to be difficult because there were few examples of integrable connections. In applying the Katz theory on rigid local systems, we get a way of constructing integrable connections in a recursive way, and can obtain infinitely many examples. For example, we obtain a confluent KZ type equation from an integrable connection satisfied by Appell's hypergeometric series F_4. We show how we can get Majima's asymptotic expansions for the connection.