

解析セミナー アブストラクト

2018年5月29日（火曜日）午後16時10分～

理学部2号館1階105号室

Composite asymptotic expansions and difference equations

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Work with Augustin Fruchard. Difference equations in the complex domain of the form $y(x + \varepsilon) - y(x) = \varepsilon f(y(x))/y(x)$ are considered. The step size ε is a small parameter, and the equation has a singularity at $y = 0$. Solutions near the singularity are described using composite asymptotic expansions. More precisely, it is shown that the derivative v' of the inverse function v of a solution (the so-called Fatou coordinate) admits a Gevrey asymptotic expansion in powers of the square root of ε , denoted by η , involving functions of y and of $Y = y/\eta$.

This also yields Gevrey asymptotic expansions of the so-called Écalle-Voronin invariants of the difference equation which are functions of ε . An application coming from the theory of complex iteration is presented.