$$x = \Delta^S_{g_1 g_2 \ldots g_n \ldots} = \overline{\Delta}^s_{a_1 a_2 \ldots a_n, \ldots}, a_1 = g_1, a_{n+1} = g_{n+1} - g_n(g_n - 1); \quad (2)$$

$$x = \frac{1}{q_1} - \frac{1}{q_2} + \ldots + (-1)^{n-1}\frac{1}{q_n} + \ldots \equiv \Delta^{O_2}_{q_1 q_2 \ldots q_n \ldots}, q_n \in N, q_{n+1} \geq q_n(q_n + 1), \quad (3)$$

$$x = \Delta^{O_2}_{q_1 q_2 \ldots q_n} = \Delta^{\overline{O}_2}_{d_1 d_2 \ldots d_n, \ldots}, d_1 = q_1, d_n = q_n + 1 - q_{n-1}(q_{n-1} + 1). \quad (4)$$

Expression (1) is called the expansion of number x by Sylvester series and notation $\Delta^S_{g_1 g_2 \ldots g_n \ldots}$ is called the representation of number by Sylvester series. After conversion of the representation by means of the same alphabet we get the difference form of representation by Sylvester series (2).

Similarly, expression (3) is called the expansion of number by Ostrogradsky series. Corresponding representation (4) obtained by conversion is called the difference form of representation by Ostrogradsky series.

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Filtered cocategories

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Conilpotent cocategories are interesting thanks to the main example, tensor cocategories, which are related to A_∞-categories. A_∞-categories arising in symplectic geometry (Fukaya categories) are naturally filtered. We consider filtered cocategories foreseeing the applications to filtered A_∞-categories. A filtration on rings, modules, quivers, cocategories gives rise to a uniform structure, hence, to completion. We shall concentrate on complete cocategories, especially, on completed tensor cocategories. The main result claims that coderivations form a kind of internal hom for the monoidal category of completed tensor cocategories. As a corollary we get a multiplication on tensor cocategories of coderivations.

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