Similarly, $a_6 = \dfrac{(-1)^3 \, a_0}{2^6 \cdot 3! \, (n+1)(n+2)(n+3)}$

Subs $k = n$ and the values of $a_1, a_2, a_3, \ldots$ in equ (2) we get,

$$y = a_0 x^n \left[1 + \frac{(-1)}{2^2 \cdot 1! (n+1)} x^2 + \frac{(-1)^2 \, x^4}{2^4 \cdot 2! (n+1)(n+2)} + \frac{(-1)^3 x^6}{2^6 \cdot 3! (n+1)(n+2)(n+3)} + \ldots + \frac{(-1)^r \, x^{2r}}{2^{2r} \cdot r! (n+1)(n+2)\ldots(n+r)} \right] \quad (10)$$

Let us put $a_0 = \dfrac{1}{2^n \, \overline{|n+1}}$. Then the solution of Bessel's equation represented by equ (10) is called Bessel's function of first kind. It is ~~de~~ denoted by $J_n(x)$.