$$\begin{cases} y^{(0)} = 1 \\ \vdots \\ y^{(n)}(x) = 1 + \int_0^x d\bar{x}\,(-\alpha y^{(n-1)}) \end{cases} \qquad f \equiv -\alpha y$$

$$y^{(0)} = 1\,, \quad y^{(1)} = 1 + (-\alpha x)\,, \quad y^{(2)} = 1 + \int_0^x d\bar{x}\,(-\alpha + \alpha^2 \bar{x})$$

$$= 1 + (-\alpha x) + \frac{\alpha^2 x^2}{2}$$

$$y^{(3)} = \dots$$

$$y^{(n)} = 1 - \alpha x + \frac{\alpha^2 x^2}{2} - \frac{\alpha^3 x^3}{\underbrace{2 \cdot 3}_{3!}} + \frac{\alpha^4 x^4}{\underbrace{2 \cdot 3 \cdot 4}_{4!}} + \dots \frac{\alpha^n x^n}{n!}$$

$2!$