

$$\begin{aligned}
 f(x) &= x - a \sin x - \frac{b}{2} \sin 2x \\
 &= x - a \left[x - \frac{x^3}{3!} + \frac{x^5}{5!} + o(x^5) \right] - \frac{b}{2} \left[2x - \frac{(2x)^3}{3!} + \frac{(2x)^5}{5!} + o(x^5) \right] \\
 &= (1 - a - b)x + \left(\frac{a}{6} + \frac{2b}{3} \right) x^3 - \left(\frac{a}{120} + \frac{2b}{15} \right) x^5 + o(x^5).
 \end{aligned}$$

按题意,应有

$$\begin{cases} 1 - a - b = 0, \\ \frac{a}{6} + \frac{2b}{3} = 0, \\ \frac{a}{120} + \frac{2b}{15} \neq 0, \end{cases}$$

得 $a = \frac{4}{3}, b = -\frac{1}{3}$. 因此, 当 $a = \frac{4}{3}, b = -\frac{1}{3}$ 时, $f(x) = x - (a + b \cos x) \sin x$ 是 $x \rightarrow 0$

时关于 x 的 5 阶无穷小.