No

Date

$$I=\int_{-\pi}^{\pi}(x-a\sin x-b\cos x)^2dx$$

$$=\int_{-\pi}^{\pi}(x^2+a^2\sin^2x+b^2\cos^2x-2ax\sin x+2ab\sin x\cos x-2bx\cos x)dx$$

$$=2\int_0^{\pi}(x^2+a^2\sin^2x+b^2\cos^2x-2ax\sin x)dx$$

ここで $\boxed{\int_0^{\pi}\sin^2x\,dx}=\int_0^{\pi}\frac{1-\cos 2x}{2}dx$

$$=\left[\frac{x}{2}-\frac{\cos 2x}{4}\right]_0^{\pi}$$

$$=\frac{\pi}{2}-1+1=\boxed{\frac{\pi}{2}}$$

$$\boxed{\int_0^{\pi}\cos^2x\,dx}=\int_0^{\pi}\frac{1+\cos 2x}{2}dx$$

$$=\left[\frac{x}{2}+\frac{\cos 2x}{4}\right]_0^{\pi}$$

$$=\boxed{\frac{\pi}{2}}$$

$$\boxed{\int_0^{\pi}x\sin x\,dx}=\int_0^{\pi}x(-\cos x)'dx$$

$$=\left[-x\cos x\right]_0^{\pi}+\int_0^{\pi}\cos x\,dx$$

$$=-\pi\times(-1)+\left[\sin x\right]_0^{\pi}$$

$=\boxed{\pi}$ だから

$$I=2\int_0^{\pi}x^2dx+2a^2\times\frac{\pi}{2}+2b^2\times\frac{\pi}{2}-4a\times\pi$$

$$=2\times\frac{\pi^3}{3}+a^2\pi+b^2\pi-4a\pi$$

$$=\boxed{\pi(a-2)^2+b^2\pi+\frac{2\pi^3}{3}-4\pi}$$

ゆえに I は $a=2,\ b=0$ のとき 最小値 $\frac{2\pi^3}{3}-4\pi$ をとる.