$$\int_0^{\frac{\pi}{2}} \sin(2017x)\cos(1999x)\,dx = \boxed{\text{(viii)}}.$$

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【答】

(viii)
$\frac{1}{18}$

【解答】

積和の公式より

$$\begin{aligned}
&\int_0^{\frac{\pi}{2}} \sin(2017x)\cos(1999x)\,dx \\
=&\int_0^{\frac{\pi}{2}} \frac{1}{2}\{\sin(2017x+1999x)+\sin(2017x-1999x)\}\,dx \\
=&\frac{1}{2}\int_0^{\frac{\pi}{2}} \{\sin(4016x)+\sin(18x)\}\,dx \\
=&\frac{1}{2}\left[-\frac{1}{4016}\cos(4016x)-\frac{1}{18}\cos(18x)\right]_0^{\frac{\pi}{2}} \\
=&-\frac{1-1}{2\cdot 4016}-\frac{-1-1}{2\cdot 18} \\
=&\boldsymbol{\frac{1}{18}}
\end{aligned}$$

……(答)