Calcular $I = \int_0^{\pi} \sin^2\left(1+\frac{\theta}{2}\right)\, d\theta$.

$$I = \int_0^{\pi} \cos^2\left(\frac{\pi}{2}-1-\frac{\theta}{2}\right)\, d\theta = \int_0^{\pi} \frac{\cos(\pi-2-\theta)+1}{2}\, d\theta$$

Seja $u = \pi - 2 - \theta$, $du = -d\theta$.

$$I = \int_{-2}^{\pi-2} \frac{1+\cos u}{2}\, du = \frac{u}{2}\Big|_{-2}^{\pi-2} + \frac{\sin(u)}{2}\Big|_{-2}^{\pi-2} = \frac{\pi-2}{2} + 1 + \frac{\sin(\pi-2)}{2} + \frac{\sin 2}{2} = \boxed{\frac{\pi}{2} + \sin 2}$$

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