$$\int \sinh\left(\ln\left(\left(\frac{x}{x_0}\right)^p\right)\right)\,dx$$

We begin with a simplification of the expression $\sinh(\ln u)$

$$\sinh(\ln u) = \frac{1}{2}\left(e^{\ln u} - e^{-\ln u}\right) = \frac{1}{2}\left(e^{\ln u} - \frac{1}{e^{\ln u}}\right) = \frac{1}{2}\left(u - \frac{1}{u}\right)$$

Therefore, if $u = \left(\frac{x}{x_0}\right)^p$ then

$$\sinh(\ln u) = \frac{1}{2}\left(\left(\frac{x}{x_0}\right)^p - \left(\frac{x_0}{x}\right)^p\right)$$

We are now ready to integrate:

$$\begin{aligned}\int \sinh\left(\ln\left(\left(\frac{x}{x_0}\right)^p\right)\right)\,dx &= \frac{1}{2}\int\left(\frac{1}{x_0^p}x^p - x_0^p x^{-p}\right)\,dx \\ &= \frac{1}{2}\left(\frac{1}{x_0^p(1+p)}x^{1+p} - \frac{x_0^p}{1-p}x^{1-p}\right) + C\end{aligned}$$