$$\left(\sinh(x+2^{x})^{x}\right)' = \sinh(x+2^{x})^{x} \cdot \left(\frac{\cosh(x+2^{x}) \cdot (1+\ln(2) \cdot 2^{x})}{\sinh(x+2^{x})} \cdot x + \ln(\sinh(x+2^{x}))\right)$$