

1 Scaling and Plotting a Catenary

Below is plotted a series of cosh functions showing how you can make a cosh function looks like a square well function. The functions plotted are $N \cosh \frac{x}{a}$ where the normalization constant $N = \frac{1}{\cosh \frac{1}{a}}$, and the value of a is 2.0 (red), 1.0, 0.5, 0.3, 0.1, and 0.004 (brown). The quality suffers because this plot is just a screen capture from my computer.

It would appear that

$$\lim_{a \rightarrow 0} \frac{\cosh \frac{x}{a}}{\cosh \frac{1}{a}} = (\text{square well function}). \tag{1.1}$$

Is it so, I do not know. See if you can prove or disprove this.



