

$$\begin{aligned}
 softmax(x + c)_i &= \frac{e^{x_i + c}}{\sum_j e^{x_j + c}} \\
 &= \frac{e^{x_i} e^c}{\sum_j e^{x_j} e^c} \\
 &= \frac{e^{x_i}}{\sum_j e^{x_j}} \\
 &= softmax(x)_i
 \end{aligned}$$