NNIF Layer Scaling

Total input unit scaling

Wanted: $\qquad x_n(x) = ux + v$

Input scaling: $\qquad x_s = sx + b$

Input normalisation: $\quad x_n = cx_s + d \ \ where \ \ c = \dfrac{1}{x_{max} - x_{min}} \ \ and \ \ d = \dfrac{-x_{min}}{x_{max} - x_{min}}$

Total: $\qquad x_n = ux + v \ \rightarrow \ u = cs \ \ and \ \ v = cb + d$

Total output unit scaling

Wanted: $\qquad x(x_n) = u' x_n + v'$

Total: $\qquad x = \dfrac{x_n - v}{u} \ \rightarrow \ u' = \dfrac{1}{u} = \dfrac{1}{cs} \ \ and \ \ v' = \dfrac{-v}{u} = \dfrac{-(cb+d)}{cs}$