$\bar{n}_1 = (2x_1+1)(2u_1+1) - 2\Delta_1$

$\bar{n}_1' = (2x_1'+1)(2u_1'+1) - 2\Delta_1'\Delta x_{1/2}$

$\left\| \begin{array}{l} x_1 = x_1' + \Delta x_1' \\ u_1 = u_1' + \Delta u_1' \end{array} \right.$

$\downarrow$

$\mathcal{E} + \frac{1}{\Delta x_{1/2}}\Delta_1$

$\dashrightarrow -2\Delta_1'\Delta x_{1/2}$

$= -2(\mathcal{E} + \frac{1}{\Delta x_{1/2}}\Delta x_{1/2}\Delta_1)$

$= \cancel{-2\mathcal{E}} - 2(\mathcal{E} + \Delta_1)$

$\Rightarrow \cancel{(2x_1'+1}$

$(2(x_1'+\Delta x_1')+1)(2(u_1'+\Delta u_1')+1) - 2\Delta_1$

$= (2x_1'+1)(2u_1'+1) - 2\Delta x_{1/2}\Delta_1'$

$(2x_1'+1)(2(u_1'+\Delta u_1')+1) + 2\Delta x_1'(2(u_1'+\Delta u_1')+1) - 2\Delta_1$

$= (2x_1'+1)(2u_1'+1) - 2\Delta x_{1/2}\Delta_1'$

$\cancel{(2x_1'+1)(2u_1'+1)} + (2x_1'+1)(2\Delta u_1') + 2\Delta x_1'(2u_1'+1)$

$+ 2\Delta x_1' \cdot (2\Delta u_1') - 2\Delta_1$

$= \cancel{(2x_1'+1)(2u_1'+1)} - 2\Delta x_{1/2}\Delta_1'$

$x_1' = x_1 - \Delta x_1'$

$\Rightarrow x_1' = x_1 - \Delta_1 n_x \Delta x_{1/2}$

$u_1' = u_1 - \Delta u_1'$

$= u_1 - \Delta_1 n_u \Delta x_{1/2}$

$(2x_1'+1)(2\Delta u_1') + 2\Delta x_1'(2(u_1'+\Delta u_1')+1) - 2\Delta_1$

$= -2\Delta x_{1/2}\Delta_1'$

$\Delta u_1' = \Delta_1 \cdot \Delta u_{1\beta}'$

$= \Delta_1 \cdot n_u \Delta x_{1/2}$

$\Delta_1' = \dfrac{(2x_1'+1)(\cancel{2}\Delta u_1') + \cancel{2}\Delta x_1'(2(u_1'+\Delta u_1')+1) - \cancel{2}\Delta_1}{2\Delta x_{1/2}}$

$\Delta x_1' = \Delta_1 \cdot \Delta x_{1\beta}'$

$= \Delta_1 \cdot n_x \Delta x_{1/2}$

$= \dfrac{(2x_1'+1)(\Delta u_1') + \Delta x_1'(2(u_1' + \Delta u_1')+1) - \Delta_1}{\Delta x_{1/2}}$

$= \Delta_1 \dfrac{(2x_1'+1)(\Delta u_{1\beta}') + \Delta x_{1\beta}'(2(u_1'+\Delta u_{1\beta}')+1) - 1}{\Delta x_{1/2}}$

Be $x_{1\beta} := \beta \cdot x_1$

$= \Delta_1 \dfrac{(2x_1'+1)(\Delta u_{1\beta}') + \Delta x_{1\beta}'(2u_1'+1) + \Delta x_{1\beta}'\Delta u_{1\beta}' 1 - 1}{\Delta x_{1/2}}$

$= \Delta_1 \dfrac{(2x_1'+1)(n_u\Delta x_{1/2}) + (n_x\Delta x_{1/2})(2u_1'+1) + n_u\Delta x_{1/2}\cdot n_x\Delta x_{1/2} - 1}{\Delta x_{1/2}}$

$\Delta x_{1\beta}'\Delta u_{1\beta}' - 1 = n\Delta x_{1/2}$

$\Delta x_{1\beta}' = \dfrac{n\cdot\Delta x_{1/2}+1}{\Delta u_{1\beta}'}$

$\cancel{\text{Be } \Delta u_{1\beta}' = 1}$

$\cancel{\Rightarrow \Delta x_{1\beta}' = n\cdot\Delta x_{1/2}+1}$

$\Delta_1' = \underbrace{\Delta_1[(2x_1'+1)n_u + n_x(2u_1'+1) + n_u n_x \Delta x_{1/2}]}_{=:\mathcal{E}}$

$- \frac{1}{\Delta x_{1/2}}\cdot\Delta_1$ (1) if $\Delta x_{1/2} > 1$ $\Rightarrow \lim\limits_{\Delta x_{1/2}\to\infty}$ (1) $\to 0$