$$0 = (2x_2+1)(2u_2+1) - 2\Delta x_{12}\Delta_2 - (2x_1+1)(2u_1+1) + 2\Delta x_{12}\Delta_1$$

Be $x_1 = x_2 - \Delta x_{12}$

$$0 = (2x_2+1)(2u_2+1) - 2\Delta x_{12}\Delta_2 - (2(x_2-\Delta x_{12})+1)(2u_1+1) + 2\Delta x_{12}\Delta_1$$

$$0 = (2x_2+1)(2u_2+1) - 2\Delta x_{12}\Delta_2 - (2x_2+1)(2u_1+1) + 2\Delta x_{12}(2u_1+1)$$

Or $x_2 = x_1 + \Delta x_{12}$

$$0 = (2(x_1+\Delta x_{12})+1)(2u_2+1) - 2\Delta x_{12}\Delta_2 - (2x_1+1)(2u_1+1) + 2\Delta x_{12}\Delta_1$$

$$0 = (2x_1+1)(2u_2+1) + 2\Delta x_{12}(2u_2+1) - 2\Delta x_{12}\Delta_2 - (2x_1+1)(2u_1+1) + 2\Delta x_{12}\Delta_1$$

$$(2x_1+1)(2u_1+1) = (2x_1+1)(2u_2+1) + 2\Delta x_{12}(2u_2+1) + 2\Delta x_{12}(-\Delta_2+\Delta_1)$$

$$(2u_1+1) = (2u_2+1) + \frac{2\Delta x_{12}(2u_2+1) + 2\Delta x_{12}(-\Delta_2+\Delta_1)}{2x_1+1}$$

$$= (2u_2+1) + 2\Delta x_{12}\underbrace{\frac{1}{x_2-x_1}}\frac{(2u_2+1)+(-\Delta_2+\Delta_1)}{2x_1+1}$$

Be $u_2 = (-\Delta_2+\Delta_1+1)(2x_1y_1 + x_1+y_1)$:

$$= (2u_2+1) + \frac{2(x_2-x_1)(2u_2+1)+(-\Delta_2+\Delta_1)}{2x_1+1}$$

$$\frac{2x_2 2u_2 + 2x_2 - 2u_2 x_1 - x_1 + (-\Delta_2+\Delta_1)}{2x_1+1}$$

$$= (2u_2+1) + 2\Delta x_{12}\frac{2\cdot(-\Delta_2+\Delta_1+1)\overbrace{(2x_1+1)(2y_1+1)-1}^{(2x_1y_1+x_1+y_1)} + 1 + (-\Delta_2+\Delta_1)}{2x_1+1}$$

$$= (2u_2+1) + 2\Delta x_{12}\cdot\frac{(-\Delta_2+\Delta_1+1)(2x_1+1)(2y_1+1) - (-\Delta_2+\Delta_1+1) + (-\Delta_2+\Delta_1+1)}{(2x_1+1)}$$

$$(2u_2+1) + 2\Delta x_{12}\cdot(-\Delta_2+\Delta_1+1)(2y_1+1) \quad \checkmark$$