$$2u_1+1 = (2x_1+1)(2u_2+1) + 2(-\Delta_2+\Delta_1)x_1$$

Be $u_2 = (-\Delta_2+\Delta_1+1)x_1$

$$\Rightarrow \quad 2u_1+1 = (2x_1+1)\left[2(-\Delta_2+\Delta_1+1)x_1+1\right] + 2(-\Delta_2+\Delta_1)x_1$$

$$= (2x_1+1)\,2\cdot(-\Delta_2+\Delta_1+1)x_1 + (2x_1+1)$$

$$+ 2(-\Delta_2+\Delta_1)x_1$$

$$= (2x_1+1)\cdot 2(-\Delta_2+\Delta_1+1)x_1$$

$$+ 2(-\Delta_2+\Delta_1+1)x_1 + 1$$

$$= 2\left[(2x_1+1)(-\Delta_2+\Delta_1+1)x_1 + (-\Delta_2+\Delta_1+1)x_1\right]+1$$

$$= 2\left[(-\Delta_2+\Delta_1+1)\underbrace{x_1(2x_1+1+1)}\right]+1$$

$$= x_1(2x_1+2)$$

$$= 2x_1x_1 + 2x_1$$

$$= 2x_1x_1 + x_1 + x_1 = x_2$$

$\Rightarrow$ For this case follows: $x_1 = x_1'$

General case

$$2u_1+1 = (2x_1+1)(2u_2+1) + 2(-\Delta_2+\Delta_1)x_1$$

$$\Leftrightarrow \quad 2u_1 = (2x_1+1)(2u_2+1) + 2(-\Delta_2+\Delta_1)x_1 - 1$$

$$u_1 = \frac{1}{2}\left[(2x_1+1)(2u_2+1) + 2(-\Delta_2+\Delta_1)x_1 - 1\right]$$

$$= \underbrace{\frac{1}{2}\left[\underbrace{(2x_1+1)(2u_2+1)}_{\hat{=}\text{ odd number}} - 1\right]} + (-\Delta_2+\Delta_1)x_1$$

$\Rightarrow \frac{1}{2}\left((2x_1+1)(2u_2+1)-1\right)$ is an integer number, too.

$\rightarrow$ k_2 is an arbitrary number $\in \mathbb{N}$