Energy flux balances

A. Starting steady state

(1) surface $165 + 323 = 112 + 376 = 488$

(2) atmosphere $75 + 336 + 112 = 323 + 200 = 523$

(3) space $240 = 200 + 40$

(4) $F_{rad} = F_{atm} + F_{win}$

(5) $k = \frac{F_{up}}{F_{green}} = \frac{200}{323} \doteq 0.619$

(6) $x = \frac{F_{win}}{F_{rad}} = \frac{40}{376} \doteq 0.106$

B. New steady state

(1) surface $165 + F_{green} = 123.1 + F_{rad}$

(2) atmosphere $75 + F_{atm} + 123.1 = F_{green} + F_{up}$

(3) space $240 = F_{up} + F_{win}$

(4) $F_{rad} = F_{atm} + F_{win}$

(5) $\frac{F_{up}}{F_{green}} = \frac{200}{323}$

(6) $\frac{F_{win}}{F_{rad}} = \frac{40}{376}$

Solution: I rewrote eq. (3) as $240 = \frac{200}{323} \cdot F_{green} + \frac{40}{376} F_{rad}$ and substituted F_{rad} with $F_{green} + 165 - 123.1$ from eq. (1)