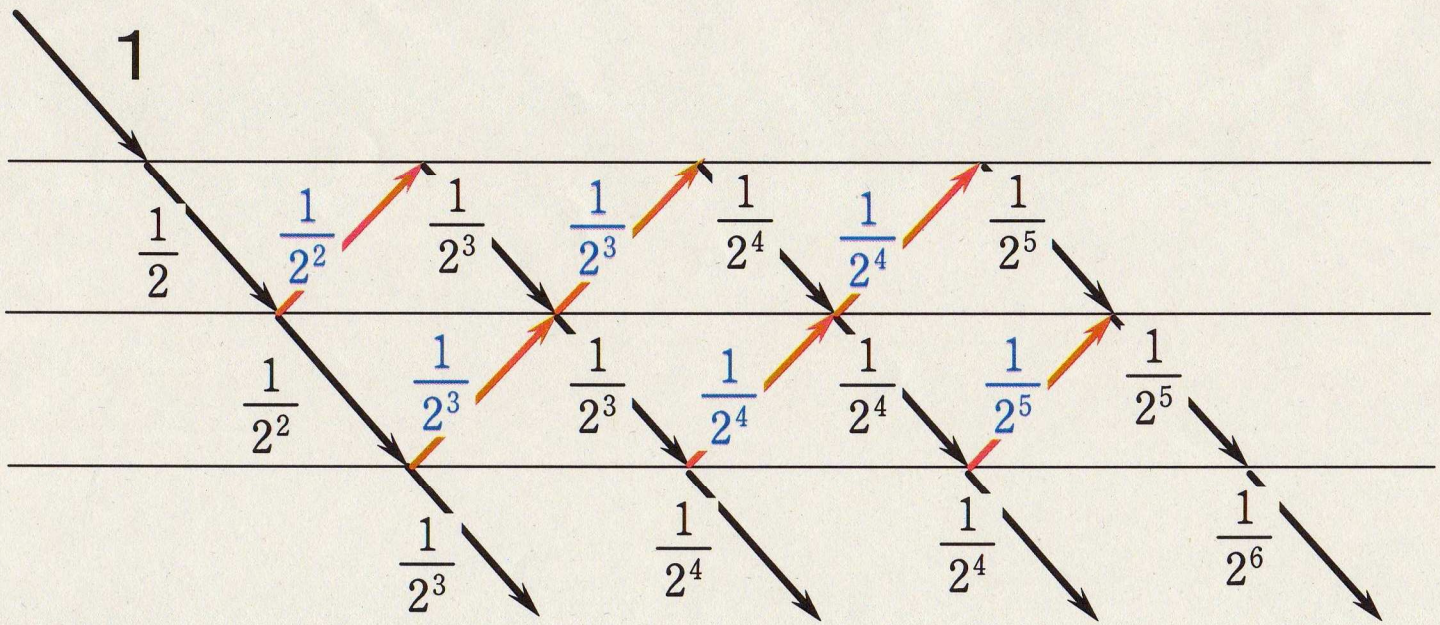
③　シートを３枚重ねたときの光の透過量



透過量Sは　$S=\frac{1}{2^3}+\frac{1}{2^4}+\frac{1}{2^5}+\frac{1}{2^6}+\cdots$

$-\quad \frac{1}{2}S=\quad \frac{1}{2^4}+\frac{1}{2^5}+\frac{1}{2^6}+\cdots$

$\left(1-\frac{1}{2}\right)S=\frac{1}{8}$

$\frac{1}{2}S=\frac{1}{8}$　　よって　$S=\frac{1}{4}$

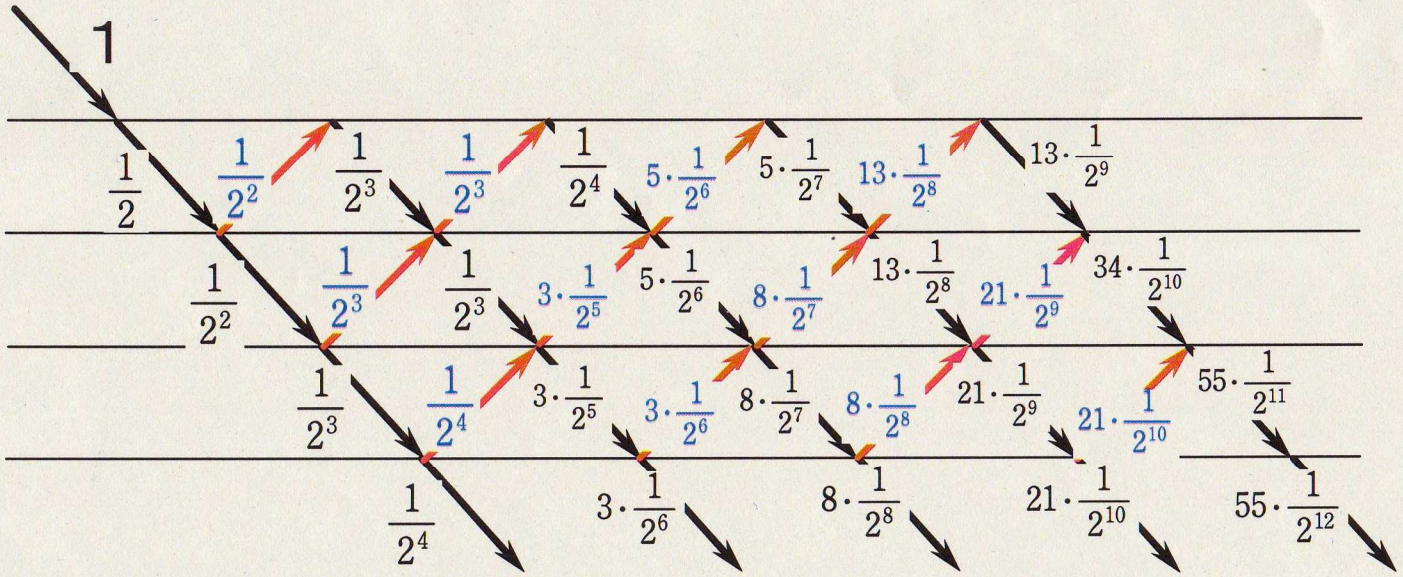
ゆえに　透過量は　$\frac{1}{4}$

・$\frac{1}{2^3}\cdot\frac{1}{2}+\frac{1}{2^3}\cdot\frac{1}{2}=\frac{1}{2^3}$

・$\frac{1}{2^4}\cdot\frac{1}{2}+\frac{1}{2^4}\cdot\frac{1}{2}=\frac{1}{2^4}$

・$\frac{1}{2^5}\cdot\frac{1}{2}+\frac{1}{2^5}\cdot\frac{1}{2}=\frac{1}{2^5}$

④　シートを４枚重ねたときの光の透過量



透過量Sは　$S=\frac{1}{2^4}+3\cdot\frac{1}{2^6}+8\cdot\frac{1}{2^8}+21\cdot\frac{1}{2^{10}}+55\cdot\frac{1}{2^{12}}+\cdots$

$$-\ \frac{1}{2^2}S=\qquad \frac{1}{2^6}+3\cdot\frac{1}{2^8}+8\cdot\frac{1}{2^{10}}+21\cdot\frac{1}{2^{12}}+55\cdot\frac{1}{2^{14}}+\cdots$$

$$\left(1-\frac{1}{4}\right)S=\frac{1}{2^4}+2\cdot\frac{1}{2^6}+5\cdot\frac{1}{2^8}+13\cdot\frac{1}{2^{10}}+34\cdot\frac{1}{2^{12}}+\cdots$$

$$\frac{3}{4}S=\frac{1}{2^4}+2\cdot\frac{1}{2^6}+5\cdot\frac{1}{2^8}+13\cdot\frac{1}{2^{10}}+34\cdot\frac{1}{2^{12}}+\cdots$$

$$-\ \frac{3}{4}\cdot\frac{1}{2^2}S=\qquad \frac{1}{2^6}+2\cdot\frac{1}{2^8}+5\cdot\frac{1}{2^{10}}+13\cdot\frac{1}{2^{12}}+34\cdot\frac{1}{2^{14}}+\cdots$$

$$\frac{3}{4}\cdot\frac{3}{4}S=\frac{1}{2^4}+\frac{1}{2^6}+3\cdot\frac{1}{2^8}+8\frac{1}{2^{10}}+21\cdot\frac{1}{2^{12}}+\cdots$$

$\frac{9}{16}S=\frac{1}{16}+\frac{1}{4}S$　　$9S=1+4S$　　よって　$S=\frac{1}{5}$　　ゆえに　透過量は　$\frac{1}{5}$

・$\frac{1}{2^3}\cdot\frac{1}{2}+\frac{1}{2^3}\cdot\frac{1}{2}=\frac{1}{2^3}$

・$\frac{1}{2^3}\cdot\frac{1}{2}+\frac{1}{2^4}\cdot\frac{1}{2}=\frac{1}{2^4}+\frac{1}{2}\cdot\frac{1}{2^4}=\frac{3}{2}\cdot\frac{1}{2^4}$
$=3\cdot\frac{1}{2^5}$

・$\frac{1}{2^4}\cdot\frac{1}{2}+3\cdot\frac{1}{2^5}\cdot\frac{1}{2}=\frac{1}{2^5}+\frac{3}{2}\cdot\frac{1}{2^5}=\frac{5}{2}\cdot\frac{1}{2^5}$
$=5\cdot\frac{1}{2^6}$

・$5\cdot\frac{1}{2^6}\cdot\frac{1}{2}+3\cdot\frac{1}{2^6}\cdot\frac{1}{2}=8\cdot\frac{1}{2^7}$

・$5\cdot\frac{1}{2^7}\cdot\frac{1}{2}+8\cdot\frac{1}{2^7}\cdot\frac{1}{2}=13\cdot\frac{1}{2^8}$

・$13\cdot\frac{1}{2^9}\cdot\frac{1}{2}+8\cdot\frac{1}{2^8}\cdot\frac{1}{2}=21\cdot\frac{1}{2^9}$

・$13\cdot\frac{1}{2^{10}}+21\cdot\frac{1}{10}=34\cdot\frac{1}{2^{10}}$