

53. (K) $a_1 \dots a_2 \dots$ $p = \frac{1}{N}$
 $b_1 \dots b_2$ q
 $a_1 b_1 \quad a_2 b_2$

$$\frac{a_1}{1-p} \cdot \frac{b_1}{1-q} = \frac{a_1 b_1}{1-pq}$$

$$1-p-q+pq = 1-pq$$

$$2pq = p+q \quad | :2$$

$$\boxed{pq = \frac{p+q}{2}}$$

(3) $pq = \frac{p+q}{2} \rightarrow 2pq = p+q$
 $2pq - p = q \rightarrow p = \frac{q}{2q-1}$

$$-1 < p < 1$$

$$-1 < \frac{q}{2q-1} < 1$$

$$0 < \frac{q+2q-1}{2q-1}$$

$$\frac{q-2q+1}{2q-1} < 0$$

$$0 < \frac{2q-1}{2q-1}$$

$$\frac{+}{1/3} \frac{+}{1/2}$$

$$\frac{1-q}{2q-1} < 0$$

$$\frac{+}{1/2} \frac{+}{1-}$$

$(q < \frac{1}{3} \vee q > \frac{1}{2})$ and $(q < \frac{1}{2} \vee q > 1)$



$q > 1$ (not valid)
 $-1 < q < \frac{1}{3}$
 not valid