$\boxed{4.2}$ Решение:

$$P = \left[\left(C_7^0 C_{10-7}^{2-0}\right)\left(C_9^2 C_{11-9}^{2-2}\right) + \right.$$

$$+ \left(C_7^1 C_{10-7}^{2-1}\right)\left(C_9^1 C_{11-9}^{2-1}\right) +$$

$$\left. + \left(C_7^2 C_{10-7}^{2-2}\right)\left(C_9^0 C_{11-9}^{2-0}\right) \right] \left[C_{10}^2 C_{11}^2 \right]^{-1} =$$

$$= \left[\left(C_7^0 C_3^2\right)\left(C_9^2 C_2^0\right) + \left(C_7^1 C_3^1\right)\left(C_9^1 C_2^1\right) + \left(C_7^2 C_3^0\right)\left(C_9^0 C_2^2\right) \right] \left[C_{10}^2 C_{11}^2 \right]^{-1} =$$

$$= \left(C_3^2 C_9^2 + C_7^1 C_3^1 C_9^1 C_2^1 + C_7^2 C_2^2 \right)\left(C_{10}^2 C_{11}^2 \right)^{-1} =$$

$$= \frac{C_3^2 C_9^2}{C_{10}^2 C_{11}^2} + \frac{C_7^1 C_3^1 C_9^1 C_2^1}{C_{10}^2 C_{11}^2} + \frac{C_7^2 C_2^2}{C_{10}^2 C_{11}^2} = (1)$$

$$\frac{C_3^2 C_9^2}{C_{10}^2 C_{11}^2} = \frac{C_3^2}{C_{10}^2} \frac{C_9^2}{C_{11}^2} = \frac{A_3^2}{2!}\left(\frac{A_{10}^2}{2!}\right)^{-1} \frac{A_9^2}{2!}\left(\frac{A_{11}^2}{2!}\right)^{-1} = \frac{A_3^2}{A_{10}^2} \frac{A_9^2}{A_{11}^2} =$$

$$= \frac{3 \cdot 2}{10 \cdot 9} \frac{9 \cdot 8}{11 \cdot 10} = \left(\frac{3}{10} \cdot \frac{2}{9}\right)\left(\frac{9}{11} \cdot \frac{8}{10}\right) =$$

$$= \frac{2 \cdot 3 \cdot \cancel{8}^{2} \cdot \cancel{9}}{\cancel{9} \cdot \cancel{10}_{5} \cdot \cancel{10}_{5} \cdot 11} = \frac{2 \cdot 2 \cdot 3}{11 \cdot 25} = \frac{3 \cdot 4}{11 \cdot 25} = \frac{12}{11 \cdot 25}$$

$$\frac{C_7^2 C_2^2}{C_{10}^2 C_{11}^2} = \frac{C_7^2}{C_{10}^2} \cdot \frac{C_2^2}{C_{11}^2} = \frac{A_7^2}{A_{10}^2} \frac{A_2^2}{A_{11}^2} = \frac{7 \cdot 6}{10 \cdot 9} \frac{2 \cdot 1}{11 \cdot 10} = \left(\frac{7}{10} \cdot \frac{6}{9}\right) \cdot \left(\frac{2}{11} \frac{1}{10}\right) =$$

$$= \frac{\cancel{2} \cdot \cancel{6} \cdot 7}{\cancel{9}_{3} \cdot \cancel{10}_{5} \cdot \cancel{10}_{5} \cdot 11} = \frac{7}{3 \cdot 5 \cdot 5 \cdot 11} = \frac{7}{3 \cdot 11 \cdot 25}$$

$$\frac{C_7^1 C_3^1 C_9^1 C_2^1}{C_{10}^2 C_{11}^2} = \frac{C_7^1 C_3^1}{C_{10}^2} \cdot \frac{C_9^1 C_2^1}{C_{11}^2} =$$

$$= 7 \cdot 3 \left(\frac{10 \cdot 9}{2!}\right)^{-1} \cdot 9 \cdot 2 \left(\frac{11 \cdot 10}{2!}\right)^{-1} =$$

$$= 2\,\frac{7 \cdot 3}{10 \cdot 9} \cdot 2\,\frac{9 \cdot 2}{11 \cdot 10} = \left(\frac{7}{10} \cdot \frac{3}{9} + \frac{3}{10} \cdot \frac{7}{9}\right)\left(\frac{9}{11} \cdot \frac{2}{10} + \frac{2}{11} \cdot \frac{9}{10}\right) =$$

$$= \frac{\cancel{2} \cdot \cancel{2} \cdot 2 \cdot 3 \cdot 7 \cdot \cancel{9}}{\cancel{9} \cdot \underset{5}{\cancel{10}} \cdot \underset{5}{\cancel{10}} \cdot 11} = \frac{2 \cdot 3 \cdot 7}{5 \cdot 5 \cdot 11} = \frac{6 \cdot 7}{11 \cdot 25} = \frac{42}{11 \cdot 25}$$

$$(1) = \frac{12}{11 \cdot 25} + \frac{7}{3 \cdot 11 \cdot 25} + \frac{42}{11 \cdot 25} = \frac{3 \cdot 12 + 7 + 3 \cdot 42}{3 \cdot 11 \cdot 25} =$$

$$= \frac{36 + 7 + 126}{33 \cdot 25} = \frac{169}{825}$$

Ответ:

$$\boxed{P = \left(C_3^2 C_9^2 + C_7^1 C_3^1 C_9^1 C_2^1 + C_7^2 C_2^2\right)\left(C_{10}^2 C_{11}^2\right)^{-1} = \frac{169}{825}}$$