

Exercício sobre confiabilidade

Componente 1
 $p_1 = 0,1$

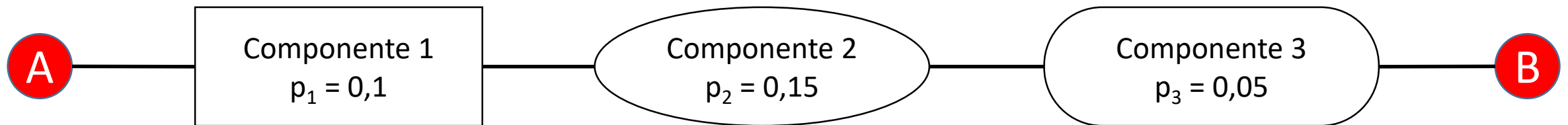
Componente 2
 $p_2 = 0,15$

Componente 3
 $p_3 = 0,05$

A

B

Sem redundância

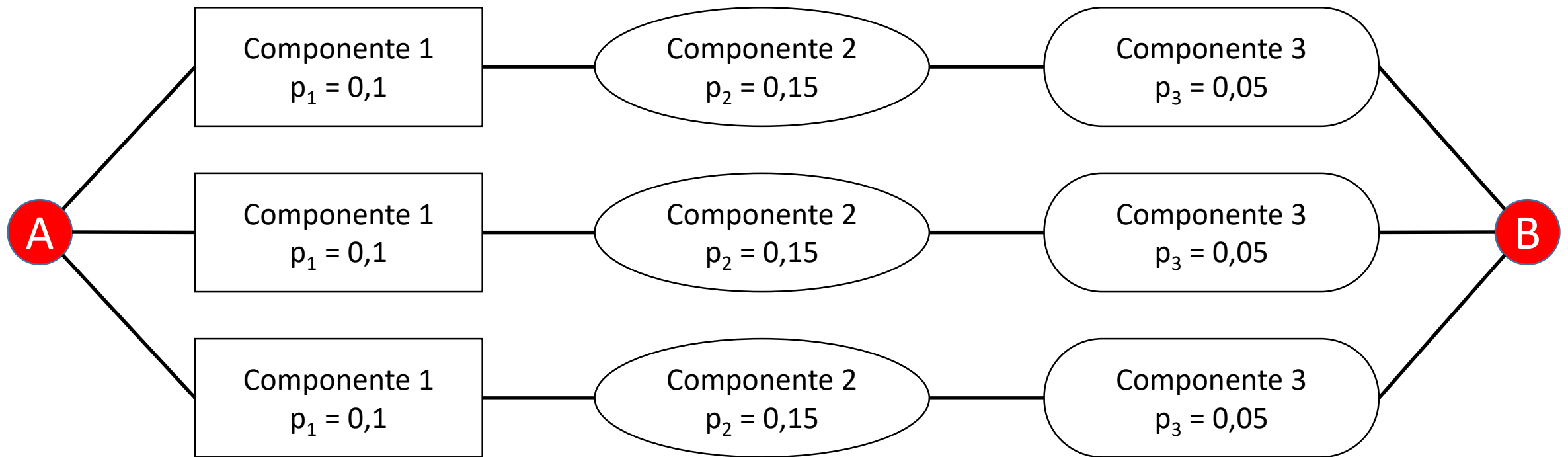


$$P(\text{n\~ao falhar}) = P_1(\text{n\~ao falhar}) \times P_2(\text{n\~ao falhar}) \times P_3(\text{n\~ao falhar})$$

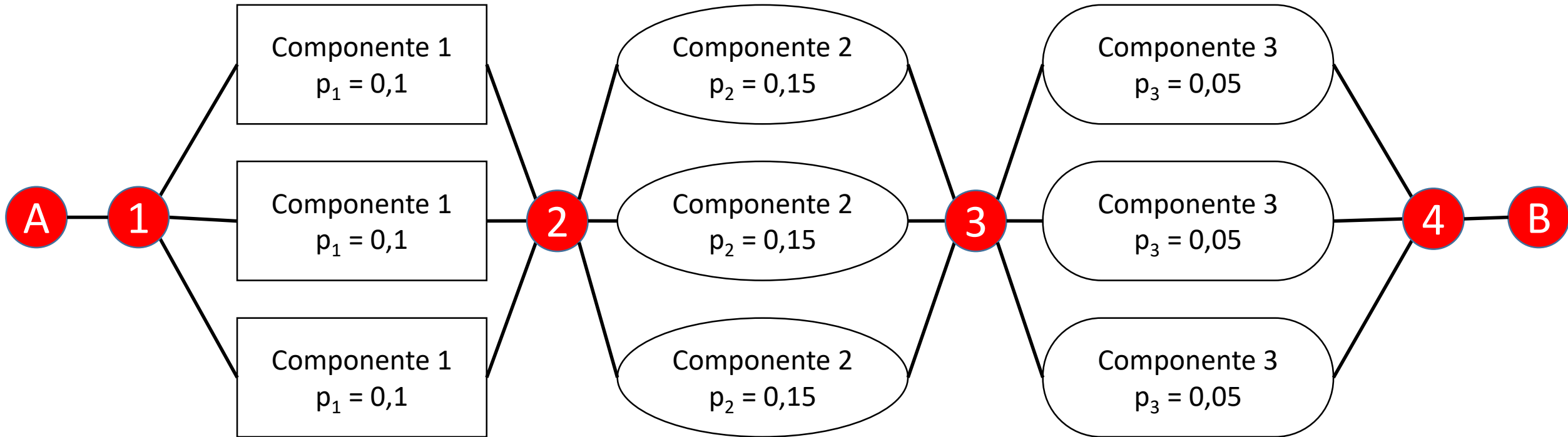
$$P(\text{n\~ao falhar}) = (1 - 0,1) \times (1 - 0,15) \times (1 - 0,05) = 0,72675$$

$$P(\text{falhar}) = 1 - P(\text{n\~ao falhar}) = 0,27325 \cong 27\%$$

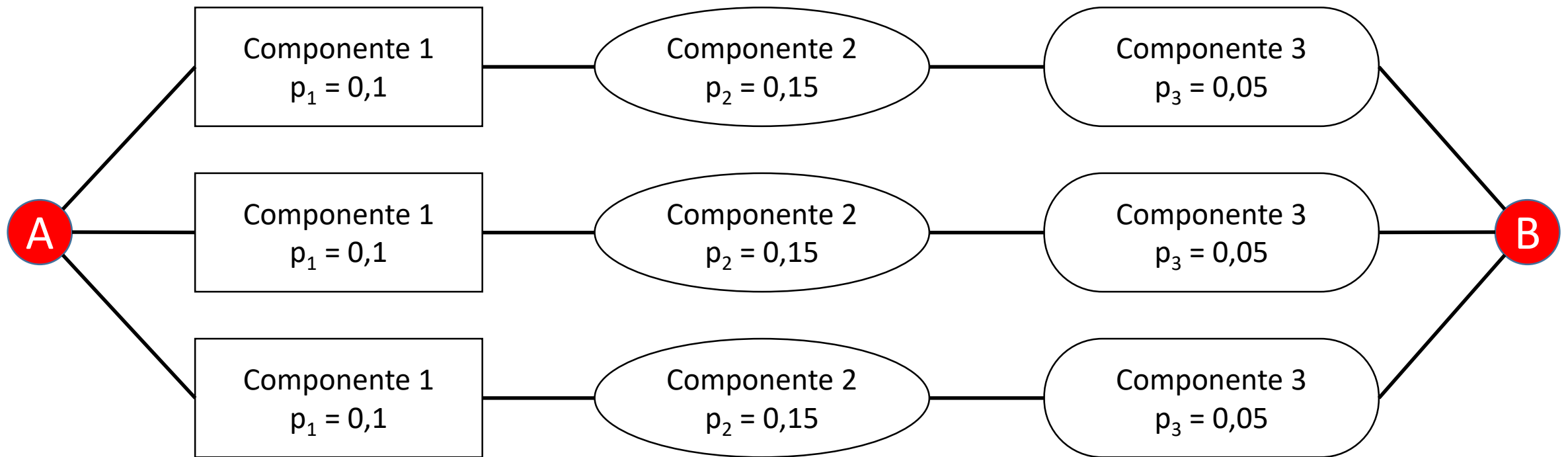
Com redundância (1)



Com redundância (2)



Com redundância (1)



$$P(\text{falhar}) = P_{c1}(\text{falhar}) \times P_{c2}(\text{falhar}) \times P_{c3}(\text{falhar}) = 0,27325^3 \cong 0,02042$$

$$P(\text{falhar}) \cong 2\%$$

Com redundância (2)

$$P_{bloco1}(falhar) = P_1(falhar)^3$$

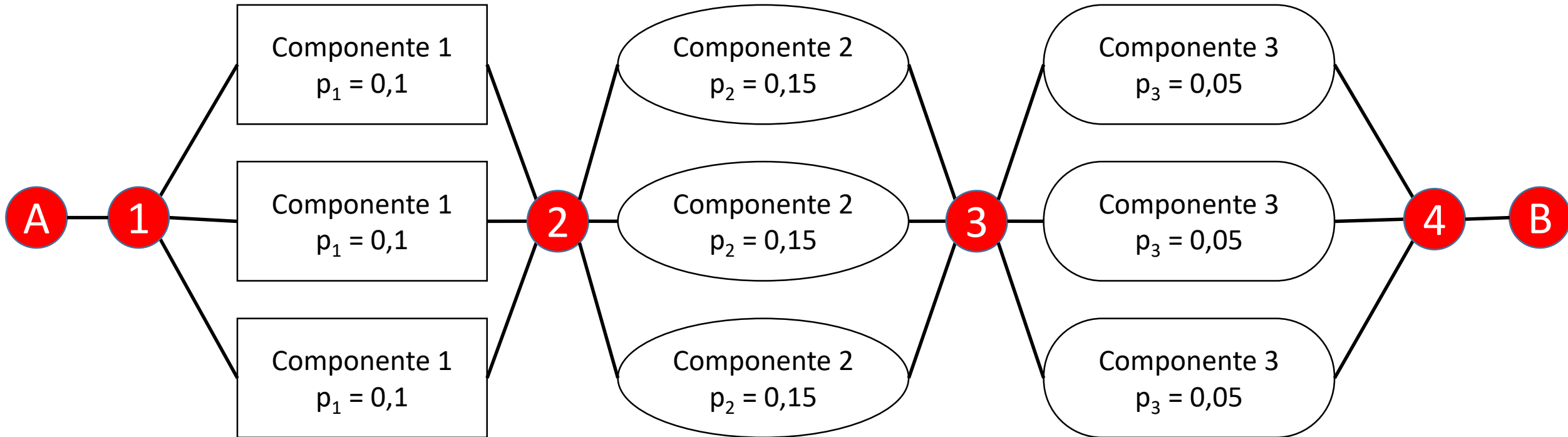
$$P_{bloco1}(falhar) = 10^{-3}$$

$$P_{bloco2}(falhar) = P_2(falhar)^3$$

$$P_{bloco2}(falhar) = 3,375 \times 10^{-3}$$

$$P_{bloco3}(falhar) = P_3(falhar)^3$$

$$P_{bloco3}(falhar) = 1,25 \times 10^{-4}$$



$$P_{bloco1}(falhar) = P_1(falhar)^3$$

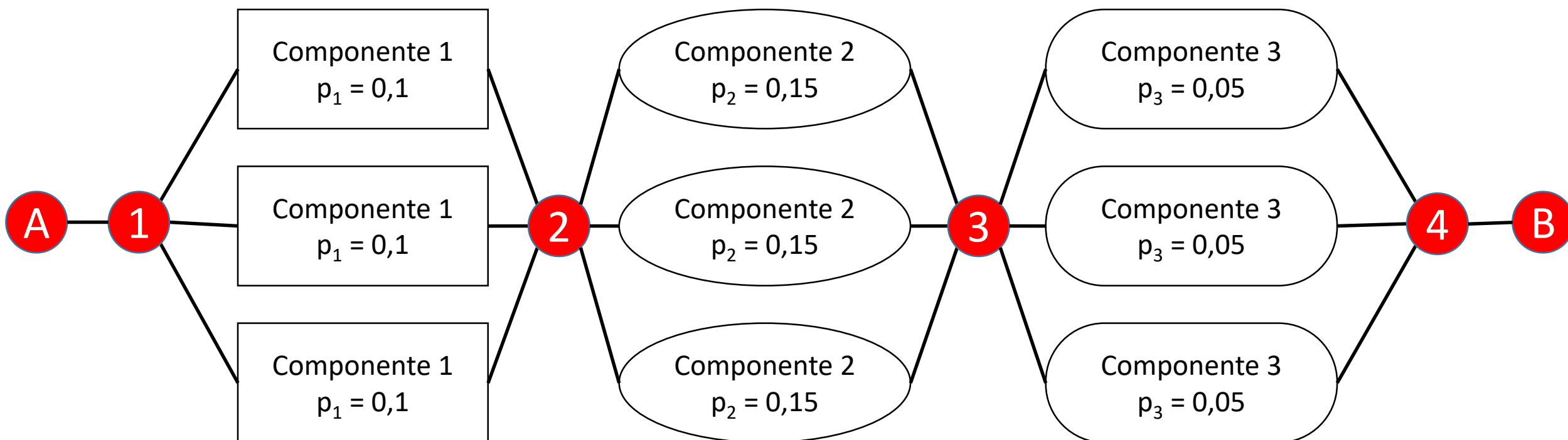
$$P_{bloco1}(falhar) = 10^{-3}$$

$$P_{bloco2}(falhar) = P_2(falhar)^3$$

$$P_{bloco2}(falhar) = 3,375 \times 10^{-3}$$

$$P_{bloco3}(falhar) = P_3(falhar)^3$$

$$P_{bloco3}(falhar) = 1,25 \times 10^{-4}$$



$$P(\text{n\~ao falhar}) = P_{bloco1}(\text{n\~ao falhar}) \times P_{bloco2}(\text{n\~ao falhar}) \times P_{bloco3}(\text{n\~ao falhar})$$

$$P(\text{n\~ao falhar}) = (1 - 10^{-3}) \times (1 - 3,375 \times 10^{-3}) \times (1 - 1,25 \times 10^{-4}) = 0,995504$$

$$P(\text{falhar}) = 1 - P(\text{n\~ao falhar}) = 0,004796 \cong 0,4\%$$