

Neka su  $A_i, i = 1..3$  događaji “tenk je pogodio  $i$ -ti projektil”,  $B_i, i = 0..3$  događaji “tenk je pogoden sa ukupno  $i$  projektila”, a  $C$  događaj “tenk je uništen”. Iz postavke zadatka direktno imamo:

$$p(A_1) = 0.2 \quad p(A_2) = 0.3 \quad p(A_3) = 0.5$$

$$p(C/B_0) = 0 \quad p(C/B_1) = 0.6 \quad p(C/B_2) = 1 \quad p(C/B_3) = 1$$

Događaji  $B_i, i = 0..3$  su sa događajima  $A_i, i = 1..3$  povezani na sljedeći način:

$$B_0 = \bar{A}_1 \bar{A}_2 \bar{A}_3$$

$$B_1 = \bar{A}_1 \bar{A}_2 A_3 + \bar{A}_1 A_2 \bar{A}_3 + A_1 \bar{A}_2 \bar{A}_3$$

$$B_2 = \bar{A}_1 A_2 A_3 + A_1 \bar{A}_2 A_3 + A_1 A_2 \bar{A}_3$$

$$B_3 = A_1 A_2 A_3$$

Kako su događaji  $A_i, i = 1..3$  međusobno nezavisni, na osnovu gornjih relacija koje povezuju događaje  $B_i, i = 0..3$  su sa događajima  $A_i, i = 1..3$  za vjerovatnoće događaja  $B_i, i = 0..3$  dobijamo:

$$p(B_0) = p(\bar{A}_1 \bar{A}_2 \bar{A}_3) = p(A_1) p(A_2) p(A_3) = (1 - p(A_1)) (1 - p(A_2)) (1 - p(A_3)) =$$

$$= (1 - 0.2) (1 - 0.3) (1 - 0.5) = 0.28$$

$$p(B_1) = p(\bar{A}_1 \bar{A}_2 A_3 + \bar{A}_1 A_2 \bar{A}_3 + A_1 \bar{A}_2 \bar{A}_3) = p(\bar{A}_1 \bar{A}_2 A_3) + p(\bar{A}_1 A_2 \bar{A}_3) + p(A_1 \bar{A}_2 \bar{A}_3) =$$

$$= p(\bar{A}_1) p(\bar{A}_2) p(A_3) + p(\bar{A}_1) p(A_2) p(\bar{A}_3) + p(A_1) p(\bar{A}_2) p(\bar{A}_3) =$$

$$= (1 - p(A_1)) (1 - p(A_2)) p(A_3) + (1 - p(A_1)) p(A_2) (1 - p(A_3)) + p(A_1) (1 - p(A_2)) (1 - p(A_3)) =$$

$$= (1 - 0.2) (1 - 0.3) \cdot 0.5 + (1 - 0.2) \cdot 0.3 \cdot (1 - 0.5) + 0.2 \cdot (1 - 0.3) (1 - 0.5) = 0.47$$

$$p(B_2) = p(\bar{A}_1 A_2 A_3 + A_1 \bar{A}_2 A_3 + A_1 A_2 \bar{A}_3) = p(\bar{A}_1 A_2 A_3) + p(A_1 \bar{A}_2 A_3) + p(A_1 A_2 \bar{A}_3) =$$

$$= p(\bar{A}_1) p(A_2) p(A_3) + p(A_1) p(\bar{A}_2) p(A_3) + p(A_1) p(A_2) p(\bar{A}_3) =$$

$$= (1 - p(A_1)) p(A_2) p(A_3) + p(A_1) (1 - p(A_2)) p(A_3) + p(A_1) p(A_2) (1 - p(A_3)) =$$

$$= (1 - 0.2) \cdot 0.3 \cdot 0.5 + 0.2 \cdot (1 - 0.3) \cdot 0.5 + 0.2 \cdot 0.3 \cdot (1 - 0.5) = 0.22$$

$$p(B_3) = p(A_1 A_2 A_3) = p(A_1) p(A_2) p(A_3) = 0.2 \cdot 0.3 \cdot 0.5 = 0.03$$

Vjerovatnoću  $p(C)$  da tenk bude uništen računamo prema formuli o totalnoj vjerovatnoći kao:

$$p(C) = p(B_0) p(C/B_0) + p(B_1) p(C/B_1) + p(B_2) p(C/B_2) + p(B_3) p(C/B_3) = 0.532 = 53.2 \%$$

Konačno, vjerovatnoću  $p(B_1/C)$  da je uništen tenk pogoden samo jednim projektilom računamo prema Bayesovoj teoremi kao:

$$p(B_1/C) = p(C/B_1) p(B_1) / p(C) = 0.6 \cdot 0.47 / 0.532 \approx 0.530075 = 53.0075 \%$$