V afinním prostoru $\mathcal{A}_n$ určete vzájemnou polohu uvedených podprostorů:

1. $n = 4$

$$\alpha: \begin{aligned} x_1 &= -t_1 + 3t_2 \\ x_2 &= 2 \\ x_3 &= 7 + 2t_1 + 2t_2 \\ x_4 &= 15 + 6t_1 + 2t_2 \end{aligned} \qquad \beta: \begin{aligned} x_1 &= 2 + s_1 - s_2 \\ x_2 &= 7 - s_1 + 4s_2 \\ x_3 &= 5 - 2s_1 + 4s_2 \\ x_4 &= 4 \end{aligned}$$

2. $n = 4$

$$\alpha: \ 5x_1 - x_2 + x_3 + 3x_4 + 1 = 0 \qquad \beta: \ x_1 - 5x_2 - 3x_3 - x_4 + 5 = 0$$

3. $n = 4$

$$\alpha: \ x_1 - 3x_2 - 6x_3 - x_4 - 1 = 0 \qquad \beta: \begin{aligned} x_2 + 2x_3 &= 0 \\ x_1 + x_2 + 2x_3 - x_4 + 1 &= 0 \end{aligned}$$

4. $n = 4$

$$p: \begin{aligned} x_1 &= 1 + t \\ x_2 &= -t \\ x_3 &= 0 \\ x_4 &= -1 \end{aligned} \qquad \alpha: \begin{aligned} x_1 + x_3 + x_4 + 1 &= 0 \\ x_2 - 1 &= 0 \end{aligned}$$

5. $n = 4$

$$\alpha: \begin{aligned} x_1 &= 1 + 3t_1 \\ x_2 &= -3t_1 - 3t_2 \\ x_3 &= 1 + t_1 - 2t_2 \\ x_4 &= 3 - 2t_1 + 7t_2 \end{aligned} \qquad \beta: \begin{aligned} x_2 + 4 &= 0 \\ 9x_1 - 3x_3 + 2x_4 - 12 &= 0 \end{aligned}$$

6. $n = 4$

$$\alpha: \begin{aligned} x_1 &= 7 + 2t_1 + t_2 \\ x_2 &= 8 + 3t_1 + 2t_2 \\ x_3 &= 3 + t_1 \\ x_4 &= 2 + t_1 \end{aligned} \qquad \beta: \begin{aligned} x_1 &= 4 + s_1 \\ x_2 &= 4 + 2s_1 + s_2 \\ x_3 &= 2 - s_1 - s_2 + s_3 \\ x_4 &= -s_3 \end{aligned}$$

7. $n = 4$

$$\alpha: \begin{aligned} x_1 &= t_1 \\ x_2 &= t_2 \\ x_3 &= -t_1 + 2t_2 \\ x_4 &= 1 + t_2 \end{aligned} \qquad \beta: \begin{aligned} x_1 &= 2s_1 + s_2 \\ x_2 &= -s_1 \\ x_3 &= 1 + s_2 \\ x_4 &= 1 + s_1 + s_2 \end{aligned}$$

8. $n = 4$

$$\alpha: \begin{aligned} x_1 &= 4 + t - 2s \\ x_2 &= -3 + 2t + 2s \\ x_3 &= 2 + 3t + 3s + r \\ x_4 &= 1 + 2t - 4s - 3r \end{aligned} \qquad \beta: \begin{aligned} &2x_1 + 3x_2 - 2x_3 - x_4 + 4 = 0 \\ &3x_2 - 2x_3 + 13 = 0 \end{aligned}$$

9. $n = 4$

$$\alpha: \begin{aligned} &x_2 - x_3 + x_4 + 1 = 0 \\ &x_1 + x_2 - x_3 = 0 \end{aligned} \qquad \beta: \begin{aligned} x_1 &= 3 + t + 2s \\ x_2 &= -1 - s \\ x_3 &= 2 + t + s + r \\ x_4 &= 2 + t + 2s + 3r \end{aligned}$$

10. $n = 4$

$$p: \begin{aligned} &x_1 - 2x_2 + 3x_3 + x_4 - 5 = 0 \\ &3x_1 + x_2 - 3x_3 - x_4 - 8 = 0. \\ &3x_3 + x_4 - 7 = 0 \end{aligned} \qquad \beta: \begin{aligned} &x_1 + x_2 - 4 = 0 \\ &x_1 - 1 = 0 \end{aligned}$$

11. $n = 4$

$$p: \begin{aligned} &x_1 - 2x_2 + 3x_3 + x_4 - 5 = 0 \\ &3x_1 + x_2 - 3x_3 - x_4 - 8 = 0. \\ &3x_3 + x_4 - 7 = 0 \end{aligned} \qquad \beta: \begin{aligned} &x_1 + x_2 - 4 = 0 \\ &x_1 - x_2 + 2 = 0 \end{aligned}$$

12. $n = 3$

$$p: \begin{aligned} x_1 &= 1 + t \\ x_2 &= 2 - t \\ x_3 &= -1 + t \end{aligned} \qquad q: \begin{aligned} x_1 &= s \\ x_2 &= 9 \\ x_3 &= -2 \end{aligned}$$

13. $n = 3$

$$p: \begin{aligned} x_1 &= 2 + t \\ x_2 &= 7 - 2t \\ x_3 &= -2 + 3t \end{aligned} \qquad q: \begin{aligned} x_1 &= 1 + 5s \\ x_2 &= -3 + 2s \\ x_3 &= 4 - 2s \end{aligned}$$

14. $n = 3$

$$p: \begin{aligned} x_1 &= 2 + r \\ x_2 &= r \\ x_3 &= 1 + 2r \end{aligned} \qquad \alpha: \begin{aligned} x_1 &= 1 + t \\ x_2 &= -1 + 2t + s \\ x_3 &= -t + s \end{aligned}$$

15. $n = 3$

$$p: \begin{aligned} x_1 &= 3 + t \\ x_2 &= -3 - 2t \\ x_3 &= -3 - 3t \end{aligned} \qquad \alpha: \quad x_1 + x_2 - x_3 + 3 = 0$$

16. $n = 3$

$$\alpha: \quad 2x_1 + 3x_2 + x_3 - 2 = 0 \qquad \beta: \quad x_1 + x_2 - x_3 + 1 = 0$$

17. $n = 3$

$$\alpha: \begin{aligned} x_1 &= 1 + t_1 + t_2 \\ x_2 &= 1 - t_1 + 2t_2 \\ x_3 &= -1 - 2t_1 - t_2 \end{aligned} \qquad \beta: \begin{aligned} x_1 &= 1 + 2s_1 - s_2 \\ x_2 &= s_1 - 5s_2 \\ x_3 &= -2 - 3s_1 \end{aligned}$$

18. $n = 3$

$$\alpha: \quad x_1 - x_3 + 1 = 0 \qquad \beta: \quad 2x_1 + x_3 - 4 = 0$$

19. $n = 4$

$$\alpha: \begin{aligned} x_1 &= 1 + t_1 - t_2 \\ x_2 &= -1 + 2t_1 + t_2 \\ x_3 &= -t_1 - t_2 \\ x_4 &= 3 + 2t_2 \end{aligned} \qquad \beta: \begin{aligned} x_1 &= 1 + s_2 \\ x_2 &= 3s_1 \\ x_3 &= 12 - 2s_1 \\ x_4 &= 2s_1 - s_2 \end{aligned}$$

20. $n = 4$

$$\alpha: \begin{aligned} x_1 &= 1 + t_1 \\ x_2 &= -t_1 + t_2 \\ x_3 &= -1 \\ x_4 &= 3 - t_2 \end{aligned} \qquad \beta: \begin{aligned} x_1 &= 3 + s_1 \\ x_2 &= -2 \\ x_3 &= 1 + 2s_1 + s_2 \\ x_4 &= 1 - s_1 + 3s_2 \end{aligned}$$

21. $n = 4$

$$\alpha: \begin{aligned} &2x_1 - x_2 + x_4 - 4 = 0 \\ &9x_2 - 3x_3 - 6x_4 + 2 = 0 \end{aligned} \qquad p: \begin{aligned} x_1 &= 1 \\ x_2 &= t \\ x_3 &= -1 + t \\ x_4 &= 1 + t \end{aligned}$$

22. $n = 4$

$$\alpha: \begin{aligned} x_1 &= 1 + t_2 \\ x_2 &= t_1 \\ x_3 &= 1 - t_1 + 2t_2 \\ x_4 &= 0 \end{aligned} \qquad \beta: \begin{aligned} x_1 &= 1 + s_1 \\ x_2 &= 2 \\ x_3 &= 3 + s_2 \\ x_4 &= -5 + 3s_1 - 4s_2 \end{aligned}$$

23. $n = 4$

$$p: \begin{aligned} &2x_2 + x_3 = 0 \\ &x_4 = 0 \\ &2x_1 - x_3 - 2 = 0 \end{aligned} \qquad \beta: \begin{aligned} &3x_2 + x_3 - 2x_4 - 1 = 0 \\ &3x_1 - x_3 - x_4 - 5 = 0 \end{aligned}$$

24. $n = 4$

$$\alpha: \quad x_2 - x_4 + 12 = 0 \qquad \beta: \begin{aligned} x_1 &= 1 + s \\ x_2 &= -2 + t \\ x_3 &= 3 + t + s \\ x_4 &= 10 + t \end{aligned}$$

25. $n = 4$

$$\alpha: \quad \begin{aligned} x_1 &= -2 - 2t_1 \\ x_2 &= t_2 \\ x_3 &= 7 + 5t_1 + 2t_2 \\ x_4 &= 2 + t_1 \end{aligned} \qquad \beta: \quad \begin{aligned} x_1 &= 1 + s_1 \\ x_2 &= -1 - 2s_1 \\ x_3 &= -4 - 5s_1 + 3s_2 \\ x_4 &= s_2 \end{aligned}$$

26. $n = 4$

$$\alpha: \quad x_2 + x_4 + 12 = 0 \qquad \beta: \quad \begin{aligned} x_1 &= 1 + s \\ x_2 &= -2 + t \\ x_3 &= 3 + t + s \\ x_4 &= 10 - t \end{aligned}$$

27. $n = 4$

$$\alpha: \quad x_2 + x_4 + 12 = 0 \qquad \beta: \quad \begin{aligned} x_1 &= 1 + s \\ x_2 &= -2 + t \\ x_3 &= 3 + t + s \\ x_4 &= 10 - t \end{aligned}$$