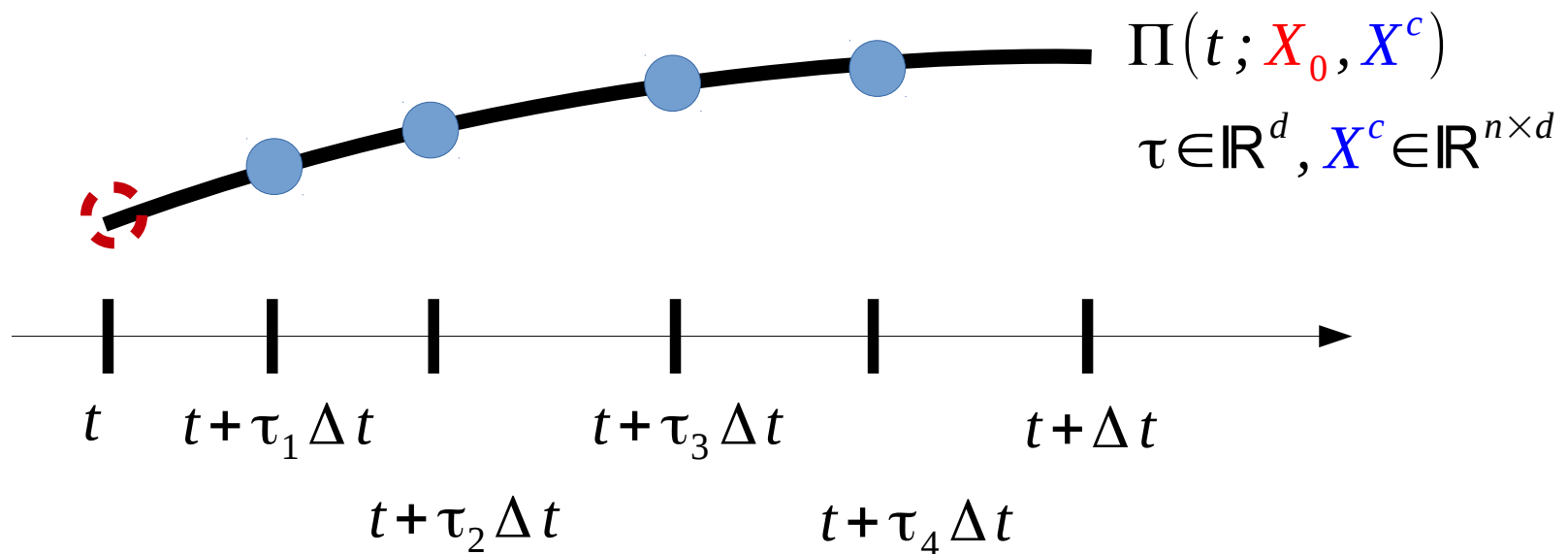


12. direct collocation

Recall: collocation integrator



$$\dot{\Pi}(t + \tau_j \Delta t; X_0, X^c) = f(t + \tau_j \Delta t, X_j^c)$$

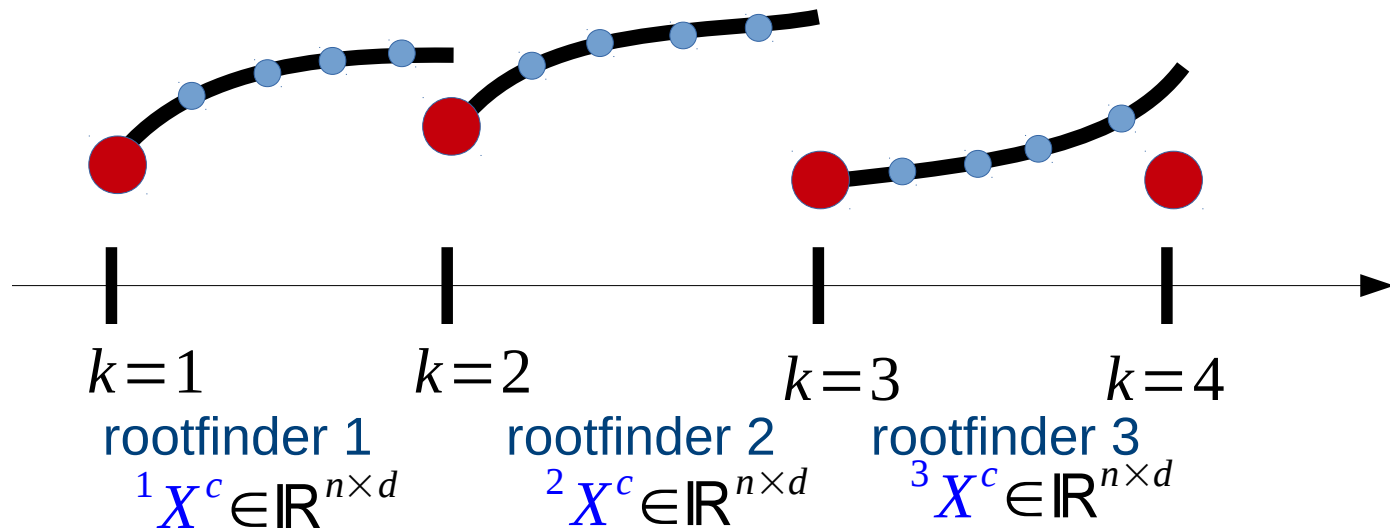
Rootfinding $\rightarrow X^c$



Multiple shooting with collocation integrator

- Decision variables:

$$\mathbf{x}_k \in \mathbb{R}^n$$

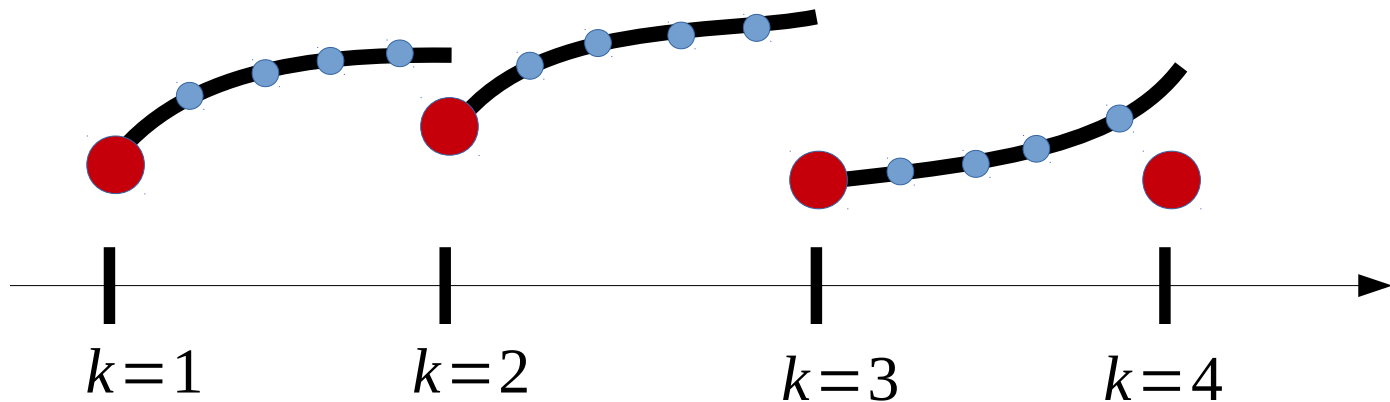


$$\dot{\Pi}(t_k + \tau_j \Delta t; \mathbf{x}_k, {}^kX^c) = f(t_k + \tau_j \Delta t, {}^kX_j^c)$$

Direct collocation

- Decision variables:

$$\mathbf{x}_k \in \mathbb{R}^n, \mathbf{X}_k^c \in \mathbb{R}^{n \times d}$$



$$\dot{\Pi}(t_k + \tau_j \Delta t; \mathbf{x}_k, {}^k\mathbf{X}^c) = f(t_k + \tau_j \Delta t, {}^k\mathbf{X}_j^c)$$

12. direct collocation