Zadatak 14. Tijelo se giba jednoliko po pravcu prema zakonu **a)** $s = 20 + 3t$; **b)** $s = 10 + 2t + 0.2t^2$, gdje je t vrijeme izraženo u sekundama, a s put u metrima. Kolika je:

1) srednja brzina u vremenskom intervalu [2,5];

2) srednja brzina u vremenskom intervalu [2,3];

3) trenutna brzina u trenutku $t = 2$?

Rješenje. **a)**

1) $\overline{v} = \dfrac{\Delta s}{\Delta t} = \dfrac{s(t+\Delta t) - s(t)}{\Delta t} = \dfrac{20 + 3t + 3\Delta t - 20 - 3t - 3\Delta t}{\Delta t} = 3 \text{ m/s}.$

2) $\overline{v} = 3 \text{ m/s}.$

3) $v = 3 \text{ m/s}.$

b)

1) $\overline{v} = \dfrac{\Delta s}{\Delta t} = \dfrac{s(t+\Delta t) - s(t)}{\Delta t} = \dfrac{10 + 2t + 2\Delta t + 0.2(t+\Delta t)^2 - 10 - 2t - 0.2t^2}{\Delta t} =$
$\dfrac{2\Delta t + 0.2(t^2 + 2t\Delta t + \Delta t^2) - 0.2t^2}{\Delta t} = \dfrac{2\Delta + 0.4t\Delta t + 0.2(\Delta t)^2}{\Delta t} = 2 + 0.4t +$
$0.2\Delta t = 2 + 0.4 \cdot 2 + 0.2 \cdot 3 = 3.4 \text{ m/s}.$

2) $\overline{v} = \dfrac{\Delta s}{\Delta t} = \dfrac{s(t+\Delta t) - s(t)}{\Delta t} = \dfrac{10 + 2t + 2\Delta t + 0.2(t+\Delta t)^2 - 10 - 2t - 0.2t^2}{\Delta t} =$
$\dfrac{2\Delta t + 0.2(t^2 + 2t\Delta t + \Delta t^2) - 0.2t^2}{\Delta t} = \dfrac{2\Delta + 0.4t\Delta t + 0.2(\Delta t)^2}{\Delta t} = 2 + 0.4t +$
$0.2\Delta t = 2 + 0.4 \cdot 2 + 0.2 \cdot 1 = 3 \text{ m/s}.$

3) $\Delta t \to 0,\ v = 2 + 0.4t = 2 + 0.4 \cdot 2 = 2.8 \text{ m/s}.$