

1. KOLOKVIJUM iz TEHNIČKE MEHANIKE (25.10.2017.g.)

12) DVAJE TAČKE 1 I 2 POČINJU KRETANJE ISTOVREMENO I SA ISTE POZICIJE. ONE SE KREĆU PRAVOLINIJSKI SAGLASNO JEDNAČINAMA:

$$1: s = 4t$$

$$2: s = 12t - \frac{3t^2}{2} \quad ; \quad s[m] \quad ; \quad t[s]$$

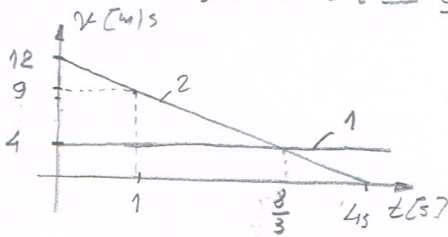
- a) NACRTATI DIJAGRAME PROMJENE BRZINE TAČKA (U) U ZAVISNOSTI OD VREMENA (t) tj.  $u = v(t)$
- b) U KOM TRENUTKU SU BRZINE TAČKA JEDNAKE
- c) ODREDITI ZAUSTAVNO VREMENE I ZAUSTAVNI PUT TAČKE 2.

a) 1:  $v_0 = 4 \text{ m/s}; a = 0$

2:  $v_0 = 12 \text{ m/s} \quad a = -\frac{3}{2} \Rightarrow a = -3 \text{ m/s}^2$

$t = 15: v = v_0 + at$

$v = 12 - 3 \cdot t \stackrel{t=1}{=} 9 \text{ m/s}$



2:  $v = 0: 12 - 3t = 0 \Rightarrow t_2 = 4.5$

b) 1:  $v = v_0 = 4$

2:  $v = 12 - 3t$

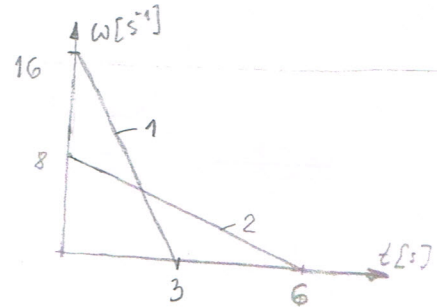
$v_1 = v_2: 4 = 12 - 3t \Rightarrow t = \frac{8}{3}$

c)  $t_2 = 4.5$

$s_2 = \frac{12 \cdot 4}{2} = 24 \text{ m}$

$$\left( \begin{array}{l} s_2 = v_0 t + \frac{a t^2}{2} = 12 \cdot t - \frac{3 \cdot t^2}{2} \\ s_2 \stackrel{t=t_2}{=} 12 \cdot 4 - \frac{3 \cdot 16}{2} = 24 \text{ m} \end{array} \right)$$

23) DVA DISKA 1 I 2 SE OBRću SAGLASNO DIJAGRAMIMA PRIKAZANIM NA SLICI:



- a) NAPIŠATI JEDNAČINE PO KOJIMA SE MIJENJAJU UGLOVI I UGAONE BRZINE DISKOVA;
- b) AKO JE ROLUPREČNIK DISKA 2  $R = 0.12 \text{ m}$  ODREDITI U TRENUTKU  $t = 15$  UGAO IZMEĐU UBRZANJA TAČKE I BRZINE TAČKE SA OBOVA DISKA 2.

a) 1:  $\omega_0 = 16 \text{ s}^{-1} \quad \epsilon = \frac{\omega - \omega_0}{t} = \frac{0 - 16}{3} = -\frac{16}{3} \text{ s}^{-2}$

$\omega = \omega_0 + \epsilon t = 16 - \frac{16}{3} t$

$\varphi = \omega_0 t + \frac{\epsilon t^2}{2} = 16t - \frac{16 \cdot 1}{3} t^2$

$\varphi = 16t - \frac{8t^2}{3}$

2:  $\omega_0 = 8 \text{ s}^{-1} \quad \epsilon = \frac{\omega - \omega_0}{t} = \frac{0 - 8}{6} = -\frac{4}{3} \text{ s}^{-2}$

$\omega = 8 - \frac{4}{3} t$

$\varphi = \omega_0 t + \frac{\epsilon t^2}{2} = 8t - \frac{4}{3} \frac{t^2}{2} = 8t - \frac{2t^2}{3}$

b)  $t = 15$

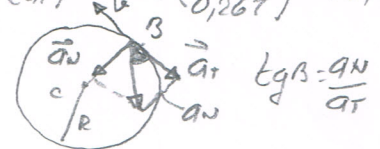
2:  $\omega = 8 - \frac{4}{3} t \stackrel{t=1}{=} \frac{20}{3} \text{ s}^{-1}$

$\epsilon = -\frac{4}{3} \text{ s}^{-2}$

$a_n = \omega^2 R = \left(\frac{20}{3}\right)^2 \cdot 0.12 = 26.67 \text{ m/s}^2$

$a_t = \epsilon \cdot R = \frac{4}{3} \cdot 0.12 = 0.167 \text{ m/s}^2$

$\beta = \arctg\left(\frac{a_n}{a_t}\right) = \arctg\left(\frac{26.67}{0.167}\right) = 89.43^\circ$



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1. KOLOKVIJUM 12 TEHNIČKE MEHANIKE (25.10.2017.g.)

12) DVAJE TAČKE 1 I 2 POČINJU KRETANJE ISTOVREMENO I SA ISTE POZICIJE. ONE SE KREĆU PRAVOLINIJSKI SAGLASNO JEDNAČINAMA:

$$1: s = v_0 t + \frac{1}{2} a t^2$$

$$2: s = 8t - \frac{1}{2} a t^2$$

$s [m]; t [s]$

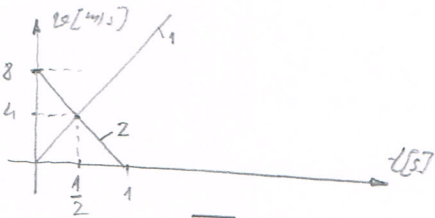
- a) ODREDITI  $v_0$  TAČKE 1 I  $a$  TAČKE 2  
 12 USLOVA DA JE LIPPOVANJE TAČKE 1  
 BREDNO JEDNAKO USPOREJENJU TAČKE 2  
 I DA SU U TRAJANJU  $t = \frac{1}{2} s$  BRZINE  
 TAČKA JEDNAKE;  
 b) DATI DIJAGRAMSKI PRIKAZ POKRETNOSTI  
 NA BRZINA TAČKA 1 I 2 U ZAVISNO-  
 STI OD  $t$ ;  
 c) ODREDITI ZAUSTAVNO VRIJEME I ZAUSTA-  
 VNI PUT TAČKE 2.

a) 1:  $\frac{a}{2} = 4 \Rightarrow a = 8 \text{ m/s}^2$   
 2:  $a = 8 \text{ m/s}^2$

1:  $v_0 = v_0 + 8t$   
 2:  $v_0 = 8 - 8t$

$\Rightarrow v_0 + 8t = 8 - 8t$   
 $v_0 = 8 - 16t \quad t = \frac{1}{2} s$

b) 1:  $s = 4t^2$        $v = 8t$   
 2:  $s = 8t - 4t^2$        $v = 8 - 8t$

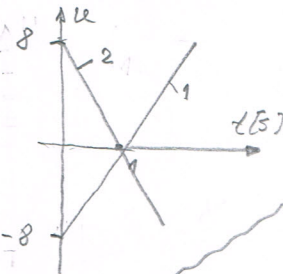


c) 2:  $v = 0 \quad 8 - 8t = 0 \quad t = 1 s$   
 2:  $s = \frac{1 \cdot 8}{2} = 4 \text{ m}$  ili  $s = \frac{t^2}{2} \cdot 8 - 4 = 4 \text{ m}$

KADA JE U ZADATKU  $t = 1 s$  UMESTO  $t = \frac{1}{2} s$

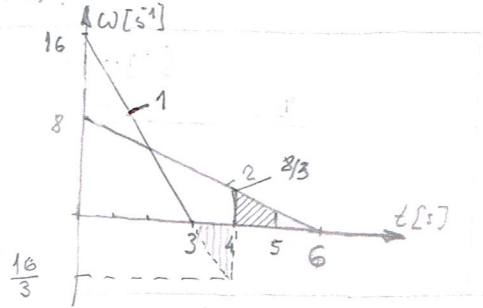
a)  $v_0 + 8t = 8 - 8t \Rightarrow v_0 = 8 - 16t \quad t = \frac{1}{2} s \Rightarrow 8 \text{ m/s}$

b) 1:  $s = 8t + 4t^2$   
 2:  $s = 8t - 4t^2$   
 1:  $v = -8 + 8t \quad t = 1 s$   
 2:  $v = 8 - 8t \quad t = 1 s$



c) 2:  $t = 1$   
 $s = \frac{1 \cdot 8}{2} = 4$

23) DVA DISKA 1 I 2 SE OBRću SAGLASNO DIJAGRAMIMA PRIKAZANIM NA SLICI:



- a) U KOM TRAJANJU SU UGLOVI  
 15) OBRĆANJA DISKOVA ISTI?  
 b) KOLIKI JE UGAO OBRĆANJA  
 16) DISKA 2 U 5. (PETOJ) SEKUNDI  
 OBRĆANJA?

a) 1:  $\omega_0 = 16 \text{ m/s}$   
 $\epsilon = \frac{\omega - \omega_0}{t} = \frac{0 - 16}{3} = -\frac{16}{3} \text{ m/s}^2$   
 $\omega = \omega_0 + \epsilon t = 16 - \frac{16}{3} t$   
 $\varphi = \omega_0 t + \frac{\epsilon t^2}{2} = 16 \cdot t - \frac{16}{3} \cdot \frac{1}{2} t^2$   
 $\varphi = 16t - \frac{8t^2}{3}$

2:  $\omega_0 = 8 \text{ s}^{-1}$   
 $\epsilon = \frac{\omega - \omega_0}{t} = \frac{0 - 8}{6} = -\frac{4}{3}$   
 $\omega = \omega_0 + \epsilon t = 8 - \frac{4}{3} t$   
 $\varphi = \omega_0 t + \frac{\epsilon t^2}{2} = 8t - \frac{4t^2}{3} = 8t - \frac{2t^2}{3}$

$\varphi_1 = \varphi_2 : 16t - \frac{8t^2}{3} = 8t - \frac{2t^2}{3}$   
 $\frac{6}{3}t = 16 - 8 \Rightarrow t = 4 s$

b) 2:  $\varphi \quad t = 5 \quad 8 \cdot 5 - \frac{2 \cdot 5^2}{3} = 40 - \frac{50}{3} = \frac{70}{3} \text{ rad}$   
 $\varphi \quad t = 4 \quad 8 \cdot 4 - \frac{2 \cdot 16}{3} = 32 - \frac{32}{3} = \frac{64}{3} \text{ rad}$

$\Delta \varphi = \varphi(t=5) - \varphi(t=4)$   
 $\Delta \varphi = \frac{70}{3} - \frac{64}{3} = \frac{6}{3} = 2 \text{ rad}$

$\left( \begin{aligned} \omega \quad t = 5 \quad 8 - \frac{4}{3} \cdot 5 = 8 - \frac{20}{3} = \frac{24 - 20}{3} = \frac{4}{3} \text{ s}^{-1} \\ \omega \quad t = 4 \quad 8 - \frac{4}{3} \cdot 4 = \frac{8}{3} \\ \Delta \varphi = \frac{8/3 + 4/3}{2} \cdot 1 = 2 \text{ rad} \end{aligned} \right)$

1:  $\omega(t=4) = 16 - \frac{16}{3} \cdot 4 = -\frac{16}{3} \text{ s}^{-1}$

$P_{\square} = \frac{(8 + 8/3) \cdot 4}{2} = \frac{64}{3}$

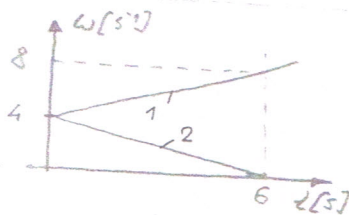
$P_{\square} + P_{\triangle} = 3 \cdot \frac{16}{2} = \frac{16}{3} \cdot \frac{1}{2} = 24 - \frac{8}{3} = \frac{64}{3}$

1. KOLOKVIJUM 12 TEHNIČKE MEHANIKE (25.10.2017.g.)

12) DVIJE TAČKE 1 I 2 POČINJU KRETANJE ISTOVREMENO I SA ISTE POZICIJE. ONE SE KREĆU PARABOLNIČKI SAGLASNO JEDNAČINAMA:

1:  $s = 2t + 4t^2$   
2:  $s = v_0 t - 6t^2$

23) DVA DISKA 1 I 2 SE OBRću SAGLASNO DIJAGRAMIMA PRIKAZANIM NA SLICI:

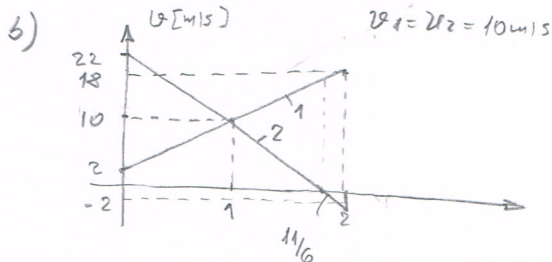


- a) ODREDITI  $v_0$  TAČKE 2 TAKO-DA  
(5) JE U TRENUTKU  $t=1s$  MJENA BRZINA ISTA KAO BRZINA TAČKE 1.  
b) NAPISATI DIJAGRAMSKI PRIKAZ PROMJENE BRZINA TAČKE 1 I TAČKE 2 U ZAVISNOSTI OD VREMENA  
c) U KOM TRENUTKU SU RASSTOJANJA TAČKA U ODNOSU NA POLAŽNI POLORAJ ISTA?

- a) NAPISATI JEDNAČINE PO KOJIMA SE MIJENJAJU UGLOVI I UGLOVNE BRZINE DISKOVA  
b) AKO JE ROLUPREČNIK DISKA 2  
(6)  $R=0,12m$  ODREDITI U TRENUTKU  $t=1s$  UGAO IZMEĐU UBRZANJA TAČKE I BRZINE TAČKE SA OBOVA DISKA 2.

a) 1:  $v_0 = 2 \text{ m/s}$   $\frac{a}{2} = 4 \Rightarrow a = 8 \text{ m/s}^2$   
 $v = 2^0 + at = 2 + 8t$   
2:  $v_0$   $\frac{a}{2} = -6 \Rightarrow a = -12 \text{ m/s}^2$   
 $v = v_0 - 12t$   
 $v_1 = v_2 : 2 + 8t = v_0 - 12t$   
 $t = 1: 2 + 8 = v_0 - 12 \cdot 1 \Rightarrow v_0 = 22 \text{ m/s}^2$

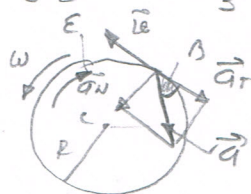
a) 1:  $\omega_0 = 4 \text{ s}^{-1}$   
 $\epsilon = \frac{\omega - \omega_0}{t} = \frac{8 - 4}{6} = \frac{4}{6} = \frac{2}{3} \text{ s}^{-2}$   
 $\omega = \omega_0 + \epsilon t = 4 + \frac{2}{3}t$   
 $\varphi = \omega_0 t + \frac{\epsilon t^2}{2} = 4t + \frac{2}{3} \cdot \frac{1}{2} t^2 = 4t + \frac{1}{3}t^2$



2:  $\omega_0 = 4$   
 $\epsilon = \frac{\omega - \omega_0}{t} = \frac{0 - 4}{6} = -\frac{2}{3} \text{ s}^{-2}$   
 $\omega = \omega_0 + \epsilon t = 4 - \frac{2}{3}t$   
 $\varphi = \omega_0 t + \frac{\epsilon t^2}{2} = 4t - \frac{2}{3} \cdot \frac{1}{2} t^2 = 4t - \frac{1}{3}t^2$

c)  $s_1 = s_2$   
 $s_1 = v_0 t + \frac{at^2}{2} = 2t + \frac{8}{2}t^2 = 2t + 4t^2$   
 $s_2 = v_0 t + \frac{at^2}{2} = 22t - \frac{12t^2}{2}$   
 $s_2 = 22t - 6t^2$

b) 2:  $\omega_{t=1} = 4 - \frac{2}{3} \cdot 1$   
 $\omega = \frac{10}{3} \text{ s}^{-1}$   
 $\epsilon_{t=1} = -\frac{2}{3} \text{ s}^{-2}$



$a_n = R \cdot \omega^2 = 0,12 \cdot \left(\frac{10}{3}\right)^2 = 10 \text{ s}^{-2}$   
 $a_t = R \cdot \epsilon = 0,12 \cdot \frac{2}{3} = 0,13 \text{ s}^{-2}$

$\beta = \arctg \frac{a_n}{a_t} = \arctg \frac{10}{0,13} = 89,28^\circ$

$2t + 4t^2 = 22t - 6t^2$

$10t = 22 - 2 = 20 \Rightarrow t = 2s$

2:  $v = 22 - 12 \cdot 2 = -2 \text{ m/s}$   
2:  $t_2: 0 = 22 - 12t_2 \Rightarrow t_2 = \frac{22}{12} = \frac{11}{6}$

1:  $v_{t=2} = 2 + 8 \cdot 2 = 18 \text{ m/s}$

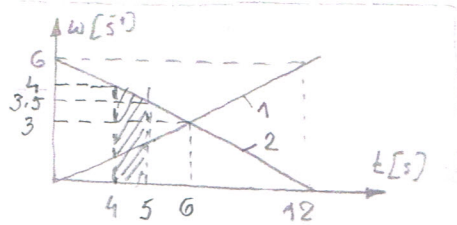
$\frac{2+18}{2} \cdot 2 = 22 \cdot \frac{11}{6} - \frac{1}{6} \cdot \frac{2}{2} \cdot 20 = 20$



1. KOLOKVIJUM 12 TEHNIČKE MEHANIKE (25.10.2017.g)

12) DVAJE TAČKE 1 I 2 POČINJU KRETANJE ISTOVREMENO I SA ISTE POZICIJE. ONE SE KREĆU PRAVOLINIJSKI SAGLASNO JEDNAČINAMA:

23) DVA DISKA 1 I 2 SE OBRĆU SAGLASNO DIJAGRAMIMA PRIKAZANIM NA SLICI:



1:  $S = 3t^2 + 9t$   $s[m]; t[s]$   
2:  $S = v_0t - \frac{3t^2}{2}$

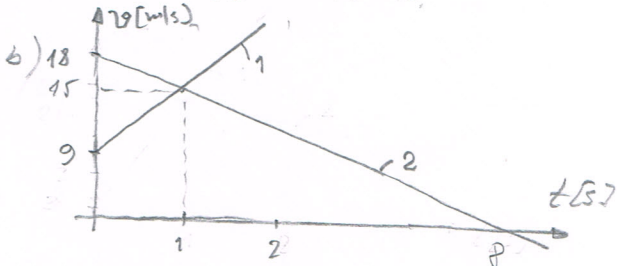
- a) ODREDITI  $v_0$  TAČKE 2 TAKO DA  
b) JE U TREUTKU  $t=1s$  NJENA BRZINA ISTA KAO BRZINA TAČKE 1.  
c) NAKRITATI DIJAGRAMSKI PRIKAZ PROMJENE BRZINA TAČKE 1 I TAČKE 2 U ZAVISNOSTI OD VREMENA  
d) U KOM TREUTKU SU RASTOJANJA TAČKA U ODNOSU NA POLARNU POUZDAJ ISTA?

- a) U KOM TREUTKU SU UGLOVI OBRATANJA DISKOVA ISTI?  
b) KOLIKI JE UGAO OBRATANJA DISKA U 5. I 6. TOJ SEKUNDI OBRATANJA?

a) 1:  $v_0 = 9 \text{ m/s}$   $\frac{a}{2} = 3 \Rightarrow a = 6 \text{ m/s}^2$   
 $v = v_0 + at = 9 + 6t$   
2:  $v_0 = ?$   $\frac{a}{2} = -\frac{3}{2} \Rightarrow a = -3$   
 $v = v_0 + at = v_0 - 3t$   
 $v_1 = v_2: 9 + 6t = v_0 - 3t$

a) 1:  $\omega_0 = 0$   $\epsilon = \frac{6-0}{12} = \frac{1}{2} \text{ s}^{-2}$   
 $\varphi = \omega_0 t + \frac{\epsilon t^2}{2} = 0 + \frac{t^2}{4}$   
2:  $\omega_0 = 6$   $\epsilon = \frac{0-6}{12} = -\frac{1}{2} \text{ s}^{-2}$   
 $\varphi = \omega_0 t + \frac{\epsilon t^2}{2} = 6t - \frac{t^2}{4}$

2:  $v_0 = 9 + 9t \stackrel{t=1}{=} 18 \text{ m/s}$



$v_1 = v_2: \frac{t^2}{4} = 6t - \frac{t^2}{4} \Rightarrow \frac{2t}{4} = 6$   
 $t = 12 \text{ s}$

$v_1 = v_2 = 9 + 6 \cdot 1 = 15 \text{ m/s}$

b) 1:  $\omega = 0 + \frac{1}{2}t$   
2:  $\omega = 6 - \frac{1}{2}t$   
 $\omega_1 = \omega_2: \frac{t}{2} = 6 - \frac{t}{2} \Rightarrow t = 6 \text{ s}; \omega = \frac{t-6}{2} = 3 \text{ s}^{-1}$

c) 1:  $S = v_0t + \frac{at^2}{2} = 9t + 3t^2$   
2:  $S = v_0t + \frac{at^2}{2} = 18t - \frac{3}{2}t^2$

2:  $\omega = 6 - \frac{t-4}{2} = 6 - \frac{4}{2} = 4 \text{ s}^{-1}$   
2:  $\omega = 6 - \frac{t-5}{2} = 6 - \frac{5}{2} = \frac{7}{2} = 3.5 \text{ m/s}^{-1}$   
 $\Delta\varphi = \varphi_2 - \varphi_1 = \frac{3.5 + 4}{2} \cdot 1 = \frac{15}{4} \text{ rad}$

$9t + 3t^2 = 18t - \frac{3}{2}t^2$   
 $\frac{3}{2}t = 9 \Rightarrow t = 6$   
(2:  $0 = 18 - 3t_2 \Rightarrow t_2 = 6$ )

2:  $\varphi(t=4) = 6 \cdot 4 - \frac{4^2}{4} = 20 \text{ rad}$   
 $\varphi(t=5) = 6 \cdot 5 - \frac{25}{4} = \frac{120 - 25}{4} = \frac{95}{4}$   
 $\Delta\varphi = \frac{95}{4} - 20 = \frac{15}{4} \text{ rad}$



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12) DVAJE TAČKE 1 I 2 POČINJU KRETANJE ISTOVREMENO I SA ISTE POZICIJE. ONE SE KREĆU PRAVOLINIJSKI SAGLASNO JEDNAČINAMA:

$$1: s = 6t + 4t^2 \quad ; \quad s[\text{m}] \quad t[\text{s}]$$

$$2: s = 10t - 2t^2$$

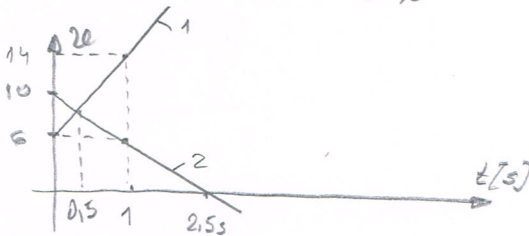
- a) NACRTATI DIJAGRAME PROMJENE
- (4) BRZINE TAČKA U U ZAVISNOSTI OD VREMENA  $t$  tj.  $v=v(t)$
- b) U KOM TRENUTKU SU BRZINE TAČKA JEDNAKE
- c) ODEREDITI ZAUSTAVNO VREMENE I
- (4) ZAUSTAVNI PUT TAČKE 2.

a) 1:  $v_0 = 6$  ;  $\frac{a}{2} = 4 \Rightarrow a = 8 \text{ m/s}^2$

$$t = 1 \text{ s} \quad v = v_0 + at = 6 + 8t = 14 \text{ m/s}$$

2:  $v_0 = 10 \text{ m/s}$  ;  $\frac{a}{2} = -2$  ;  $a = -4 \text{ m/s}^2$

$$t = 1 \quad v = 10 - 4t = 6 \text{ m/s}$$



b)  $v_1 = v_2 : 6 + 8t = 10 - 4t$

$$12t = 10 - 4 = 6$$

$$t = \frac{1}{2} \text{ s}$$

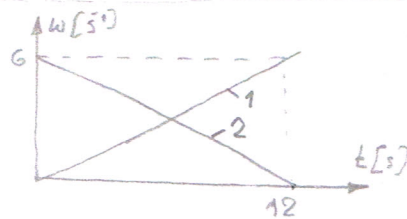
c)  $v = 10 - 4t = 0 \Rightarrow t_2 = \frac{10}{4} = \frac{5}{2} \text{ s}$

$$s_2 = \frac{5}{2} \cdot 10 - \frac{1}{2} \cdot 25 = 12.5 \text{ m}$$

$$\left( s_2 = v_0 t_2 + \frac{a t_2^2}{2} = 10 \cdot \frac{5}{2} - \frac{4 \cdot (\frac{5}{2})^2}{2} \right)$$

$$s_2 = 25 - \frac{25}{2} = 12.5 \text{ m}$$

13) DVA DISKA 1 I 2 SE OBRću SAGLASNO DIJAGRAMIMA PRIKAZANIM NA SLICI:



- a) NAPISATI JEDNAČINE PO KOJIMA SE MIJENJAJU UGLOVI I UGAONE BRZINE DISKOVA;
- b) AKO JE PDLUPREČNIK DISKA 2  $R = 0.12 \text{ m}$  ODEREDITI U TRENUTKU  $t = 1 \text{ s}$  UGAO I BRZINE TAČKE SA OBEIDA DISKA 2

a) 1:  $\omega_0 = 0$  ;  $\epsilon = \frac{\omega - \omega_0}{t} = \frac{6 - 0}{12} = \frac{1}{2} \text{ s}^{-2}$

$$\omega = \omega_0 + \epsilon t = \frac{t}{2}$$

$$\varphi = \omega_0 t + \frac{\epsilon t^2}{2} = \frac{t^2}{4}$$

2:  $\omega_0 = 6 \text{ s}^{-1}$

$$\epsilon = \frac{\omega - \omega_0}{t} = \frac{0 - 6}{12} = -\frac{1}{2} \text{ s}^{-2}$$

$$\omega = \omega_0 + \epsilon t = 6 - \frac{t}{2}$$

$$\varphi = \omega_0 t + \frac{\epsilon t^2}{2} = 6t - \frac{1}{4} t^2$$

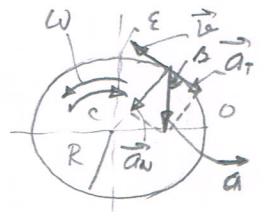
b) 2:  $t = 1 \text{ s}$

$$\omega = 6 - \frac{1}{2} = 5.5 \text{ s}^{-1}$$

$$\epsilon = -\frac{1}{2} \text{ s}^{-2}$$

$$a_T = \epsilon \cdot R = \frac{1}{2} \cdot 0.12 = 0.06 \text{ m/s}^2$$

$$a_N = R \omega^2 = 0.12 \cdot (5.5)^2 = 3.63 \text{ m/s}^2$$



$$\beta = \arctan \frac{a_N}{a_T} = \arctan \frac{3.63}{0.06} = \arctan 60.5$$

$$\beta = 89.05^\circ$$

1. KOLOKVIJUM IZ TEHNIČKE MEHANIKE (25.10.2017.g.)

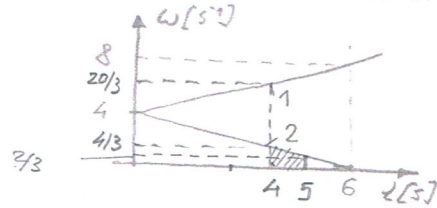
12) DVA TAČKE 1 I 2 POKUJU KREĆE. NIJE ISTOVREMENO I SA ISTE POZICIJE. ONE SE KREĆU PRAVOLINIJSKI SAGLASNO JEDNAČINAMA:

$$1: s = v_0 t + 3t^2 \quad s[m]; t[s]$$

$$2: s = 12t - \frac{a t^2}{2}$$

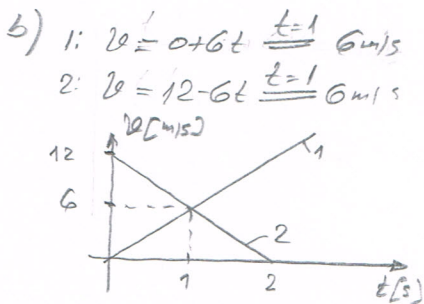
- a) ODREDITI  $v_0$  TAČKE 1 I  $a$  TAČKE 2  
IZ USLOVA DA JE UBRZANJE TAČKE 1  
BROJNO JEDNAKO USPOREJENJA TAČKE 2  
I DA SU U TRAJANJE  $t=1s$  BRZINE  
TAČKA JEDNAKE;  
b) DATI DIJAGRAMSKI PRIKAZ PROMJENA  
BREMNA TAČKA 1 I 2 U ZAVISNOSTI  
OD  $t$ ;  
c) ODREDITI ZAUSTAVNO VRIJEME I ZAUSTAVNI  
PUT TAČKE 2.

23) DVA DISKA: 1 I 2 SE OBRću SAGLASNO DIJAGRAMIMA PRIKAZANIM NA SLICI:



- a) U KOM TRAJANJE JE UGAO OBRćANJA  
DISKA 1 DVA PUTA VEĆI OD UGLO  
OBRćANJA DISKA 2  
b) KOLIKI JE UGAO OBRćANJA  
DISKA 2 U 5. (PETI) SEKUNDI  
OBRćANJA?

a) 1:  $\frac{a}{2} = 3 \Rightarrow a = 6 \text{ m/s}^2$   
2:  $a = -6 \text{ m/s}^2$   
1:  $v = 2v_0 + a \cdot t = v_0 + 6t$   
2:  $v = 2v_0 + a t = 12 - 6t$   
 $2v_0 + 6t = 12 - 6t$   
 $2v_0 = 12 - 12t \xrightarrow{t=1} 0$



c) 2:  $v = v_0 - a t = 12 - 6t = 0$   
 $t_2 = 2s$   
 $s_2 = v_0 t_2 + \frac{a t_2^2}{2} = 12 \cdot 2 - \frac{6 \cdot 2^2}{2}$   
 $s_2 = 24 - 12 = 12 \text{ m}$

a) 1:  $\omega_0 = 4 \quad \epsilon = \frac{8-4}{6} = \frac{2}{3} \text{ s}^{-2}$   
 $\varphi = \omega_0 \cdot t + \frac{\epsilon t^2}{2} = 4t + \frac{t^2}{3}$   
 $\omega = 4 + \frac{2}{3}t$   
2:  $\omega_0 = 4 \quad \epsilon = \frac{0-4}{6} = -\frac{2}{3} \text{ s}^{-2}$   
 $\varphi = \omega_0 t + \frac{\epsilon t^2}{2} = 4t - \frac{t^2}{3}$   
 $\varphi = 4t - \frac{t^2}{3}$

$\varphi_1 = 2\varphi_2 \Rightarrow 4t + \frac{t^2}{3} = 2(4t - \frac{t^2}{3})$   
 $\frac{t^2}{3} + \frac{2t^2}{3} - 8t + 4t = 0$   
 $t = 4s$

2:  $\omega = \omega_0 + \epsilon \cdot t = 4 - \frac{2}{3} \cdot 4 = \frac{4}{3} \text{ s}^{-1}$   
1:  $\omega = \omega_0 + \epsilon \cdot t = 4 + \frac{2}{3} \cdot 4 = \frac{20}{3} \text{ s}^{-1}$

b)  $t = 5s$   
2:  $\omega = 4 - \frac{2}{3} \cdot 5 = \frac{12-10}{3} = \frac{2}{3} \text{ s}^{-1}$   
 $t = 4s$   
2:  $\omega = 4 - \frac{2}{3} \cdot 4 = 4 - \frac{8}{3} = \frac{4}{3} \text{ s}^{-1}$   
 $\Delta\varphi = \frac{4}{3} - \frac{2}{3} = 1 = 1 \text{ rad}$

2:  $t = 5 \quad \varphi = 4 \cdot 5 - \frac{25}{3}$   
 $t = 4 \quad \varphi = 4 \cdot 4 - \frac{16}{3}$   
 $\Delta\varphi = \varphi_5 - \varphi_4 = 20 - \frac{25}{3} = 16 + \frac{16}{3}$   
 $\Delta\varphi = 4 - \frac{9}{3} = 1$