

```

1 import matplotlib.pyplot as plt
2 import numpy as np
3
4 #
5 v_col = 10 # / ( )
6 v_mot1 = 20 # / ( 1)
7 v_mot2 = 15 # / ( 2)
8 L = 5000 # ,
9
10 #
11 t_max = max(L/(v_mot1-v_col), L/(v_mot2+v_col)) * 1.1 #
12 times = np.linspace(0, t_max, 1000) #
13
14 #
15 pos_tail = v_col * times #
16 pos_head = L + v_col * times #
17
18 # :
19 # 1- ( )
20 pos_mot1 = v_mot1 * times # ,
21
22 # 2- ( )
23 pos_mot2 = L - v_mot2 * times # L
24
25 #
26 intersect_time1 = L / (v_mot1 - v_col) # 1
27 intersect_time2 = L / (v_mot2 + v_col) # 2
28
29 #
30 intersect_time3 = L / (v_mot1 + v_mot2) #
31
32 #
33 print("\n :")
34 print("-" * 50)
35 print(f":")
36 print(f"1. 1 : {intersect_time1:.2f} .")
37 print(f"2. 2 : {intersect_time2:.2f} .")
38 print(f"3. : {intersect_time3:.2f} .")
39
40 #
41 plt.figure(figsize=(10, 6)) #
42
43 #
44 plt.plot(times, pos_tail, label=' ', color='blue',
45 ↪ linewidth=2)
46 plt.plot(times, pos_head, label=' ', color='green',
47 ↪ linewidth=2)
48 plt.plot(times, pos_mot1, label=' 1', color='orange',
49 ↪ linewidth=2)

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47 plt.plot(times, pos_mot2, label=' 2', color='purple',
48           ↪ linewidth=2)
49
50 #
51 plt.vlines(intersect_time1, ymin=-100,
52           ↪ ymax=np.interp(intersect_time1, times, pos_head),
53           ↪ colors='black', linestyle='dashed')
54 plt.text(intersect_time1, -200, f'{intersect_time1:.2f}',
55           ↪ ha='center', va='bottom', fontweight='bold')
56
57 plt.vlines(intersect_time2, ymin=-100,
58           ↪ ymax=np.interp(intersect_time2, times, pos_tail),
59           ↪ colors='black', linestyle='dashed')
60 plt.text(intersect_time2, -200, f'{intersect_time2:.2f}',
61           ↪ ha='center', va='bottom', fontweight='bold')
62
63 # /
64 plt.vlines(intersect_time3, ymin=-100,
65           ↪ ymax=np.interp(intersect_time3, times, pos_mot1),
66           ↪ colors='black', linestyle='dashed')
67 plt.text(intersect_time3, -200, f'{intersect_time3:.2f}',
68           ↪ ha='center', va='bottom', fontweight='bold')
69
70 #
71 plt.xlabel(' ( )', fontsize=12)
72 plt.ylabel(' ( )', fontsize=12)
73 plt.title(' ', fontsize=14)
74 plt.legend(fontsize=10)
75 plt.grid(True)
76
77 # Y 11000
78 plt.ylim(-100, 11000)
79
80 #
81 plt.show()

```