5.Pips-forbs model simulation

2020112921 刘欣豪

Example – **Assignment**: Replicate this (by making up data of the lead vehicle).

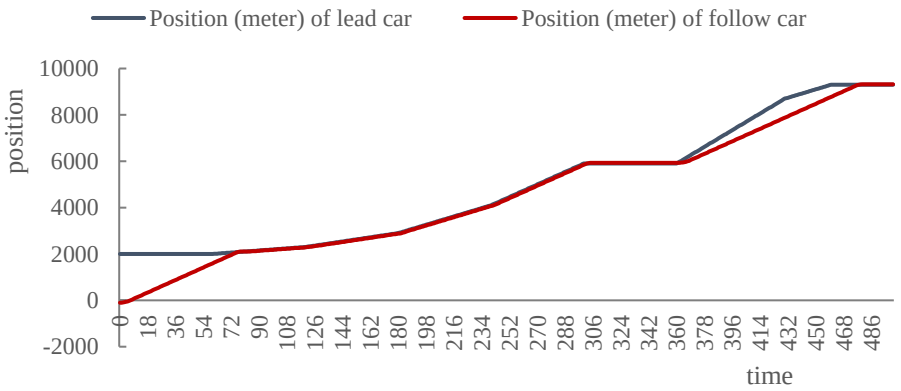
The spreadsheet shared with you has positions of the lead vehicle over time. Use the pseudocode to simulate the positions of the follower vehicle.

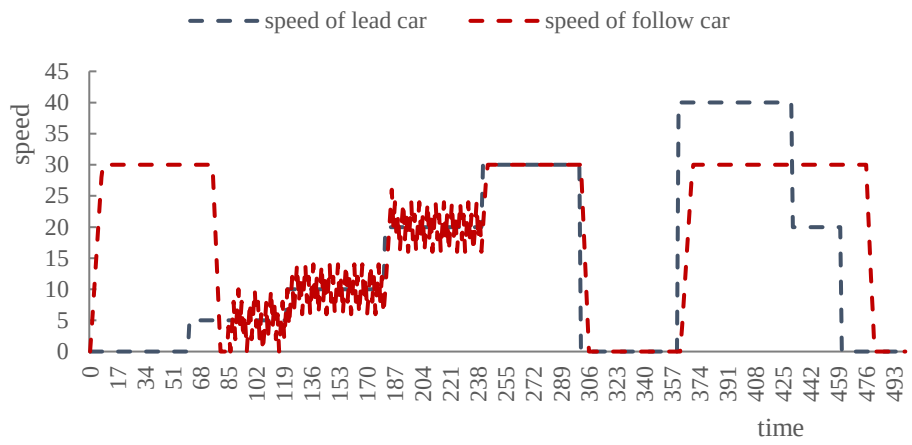
Assume that the follower vehicle starts at $x = -102$, has a maximum acceleration and deceleration of 4 m/s^2 and -6 m/s^2. Suppose that the desired speed is 30 m/s.

输出 output 表（部分）：

Time (second)	Position (meter) of lead car	speed of lead car	Position (meter) of follow car	speed of follow car	acceleration
0	2000	0	-102	0	4
1	2000	0	-98	4	4
2	2000	0	-90	8	4
3	2000	0	-78	12	4
4	2000	0	-62	16	4
5	2000	0	-42	20	4
6	2000	0	-18	24	4
7	2000	0	10	28	4
8	2000	0	40	30	4
9	2000	0	70	30	4
10	2000	0	100	30	4

仿真结果：





出现撞车现象且在渐变区域不稳定。

代码：

```
1.    import pandas as pd
2.
3.    datas = pd.read_excel('Lead+car+data.xlsx')
4.
5.    for i in range(0,500):
6.        s = datas.iloc[i,1]-datas.iloc[i,3]
7.        v = datas.iloc[i,4]
8.        smin = 6 * (v/4.47 + 1)
9.    #     print(smin)
10.       if s<smin:
11.           datas.iloc[i+1,4] = max(0,v-6)
12.           datas.iloc[i,5] = -6
13.       else:
14.           datas.iloc[i+1,4] = min(30,v+4)
15.           datas.iloc[i,5] = 4
16.       datas.iloc[i+1,3] = datas.iloc[i,3]+datas.iloc[i+1,4]
17.
18.   datas.to_excel('output.xlsx',index  =False)
```