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| --- | --- | --- | --- |
| Student ID  For group assignments, list each student’s ID | U 6366102 | | |
| Course Code | ENGN 6223 | | |
| Course Name | Control Systems | | |
| Assignment number |  | | |
| Assignment Topic | Design of Controller for Cruise Control | | |
| Lecturer | Dr. Guodong Shi | | |
| Tutor |  | | |
| Tutorial (day and time) |  | | |
| Word count |  | Due Date | 17/09/2018 |
| Date Submitted | /09/18 | Extension Granted |  |

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* is original, except where collaboration (for example group work) has been authorised in writing by the course convener in the course outline and/or Wattle site;
* is produced for the purposes of this assessment task and has not been submitted for assessment in any other context, except where authorised in writing by the course convener;
* gives appropriate acknowledgement of the ideas, scholarship and intellectual property of others insofar as these have been used;
* in no part involves copying, cheating, collusion, fabrication, plagiarism or recycling

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# Introduction

# Systems Modelling and Simulations

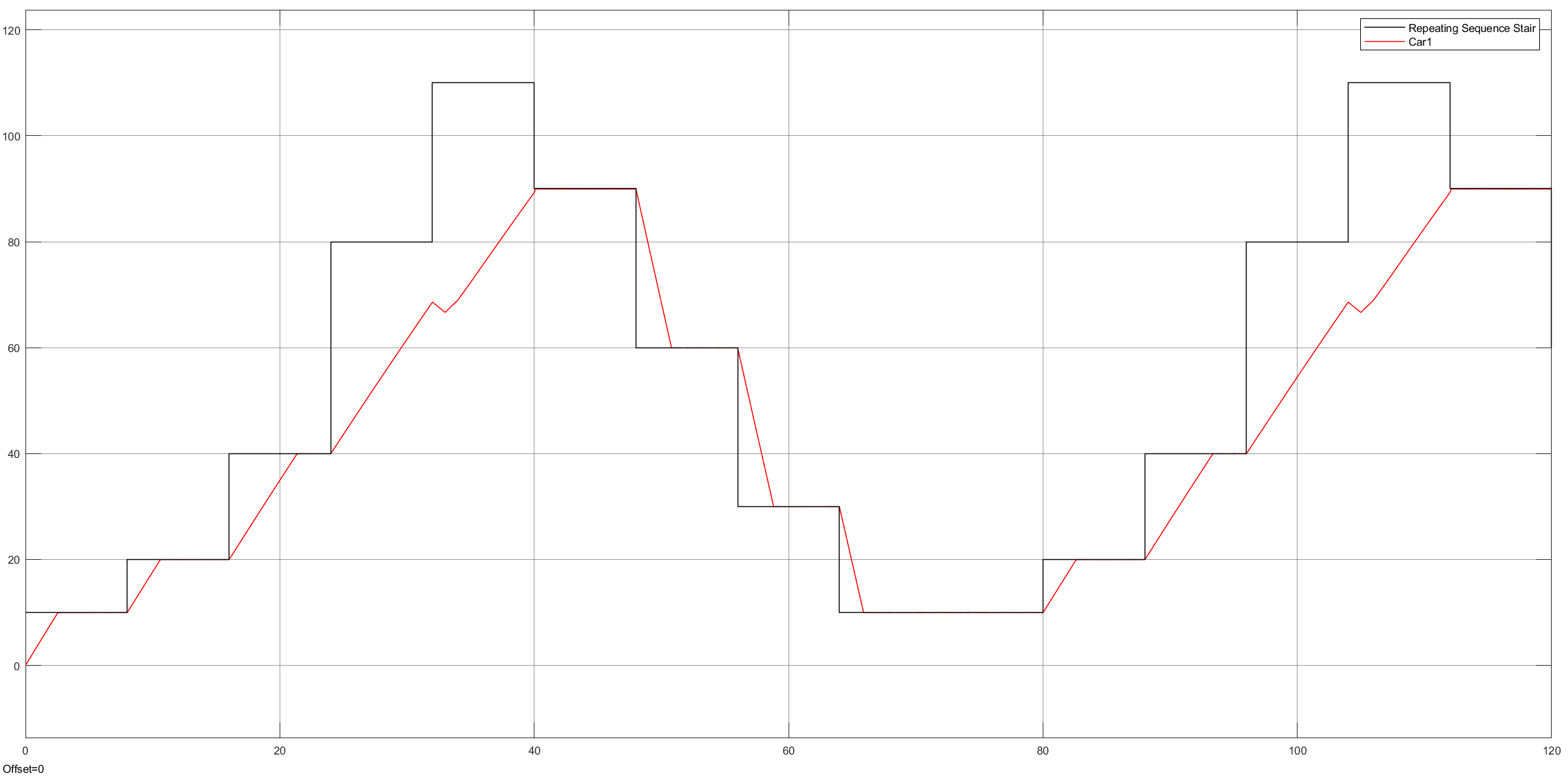
# Controller Design and Validations

# Discussions and Conclusions

# Appendix: Models and Graphs

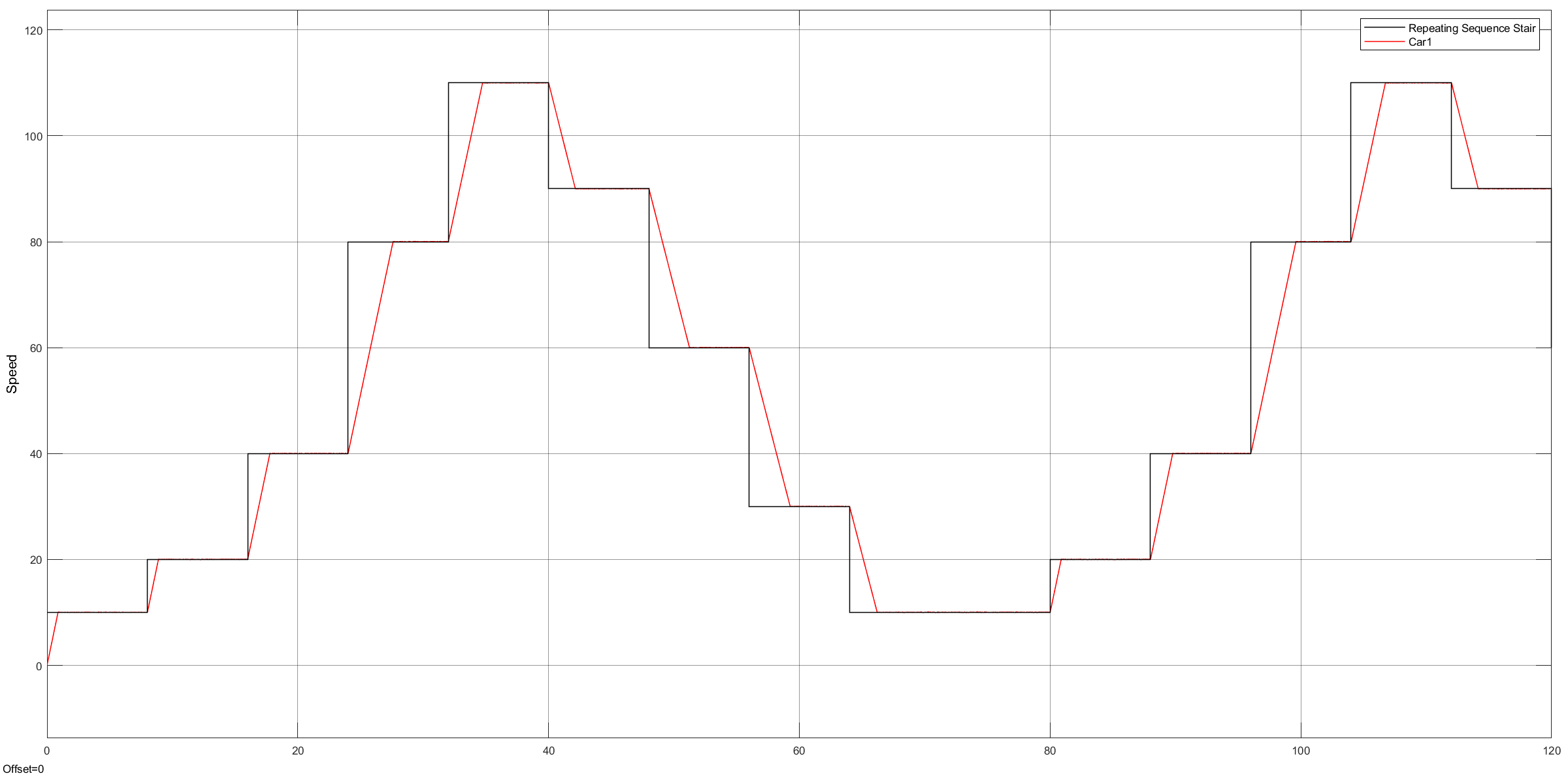
## Fuzzy P Controller design for an average car

### Uphill scenario

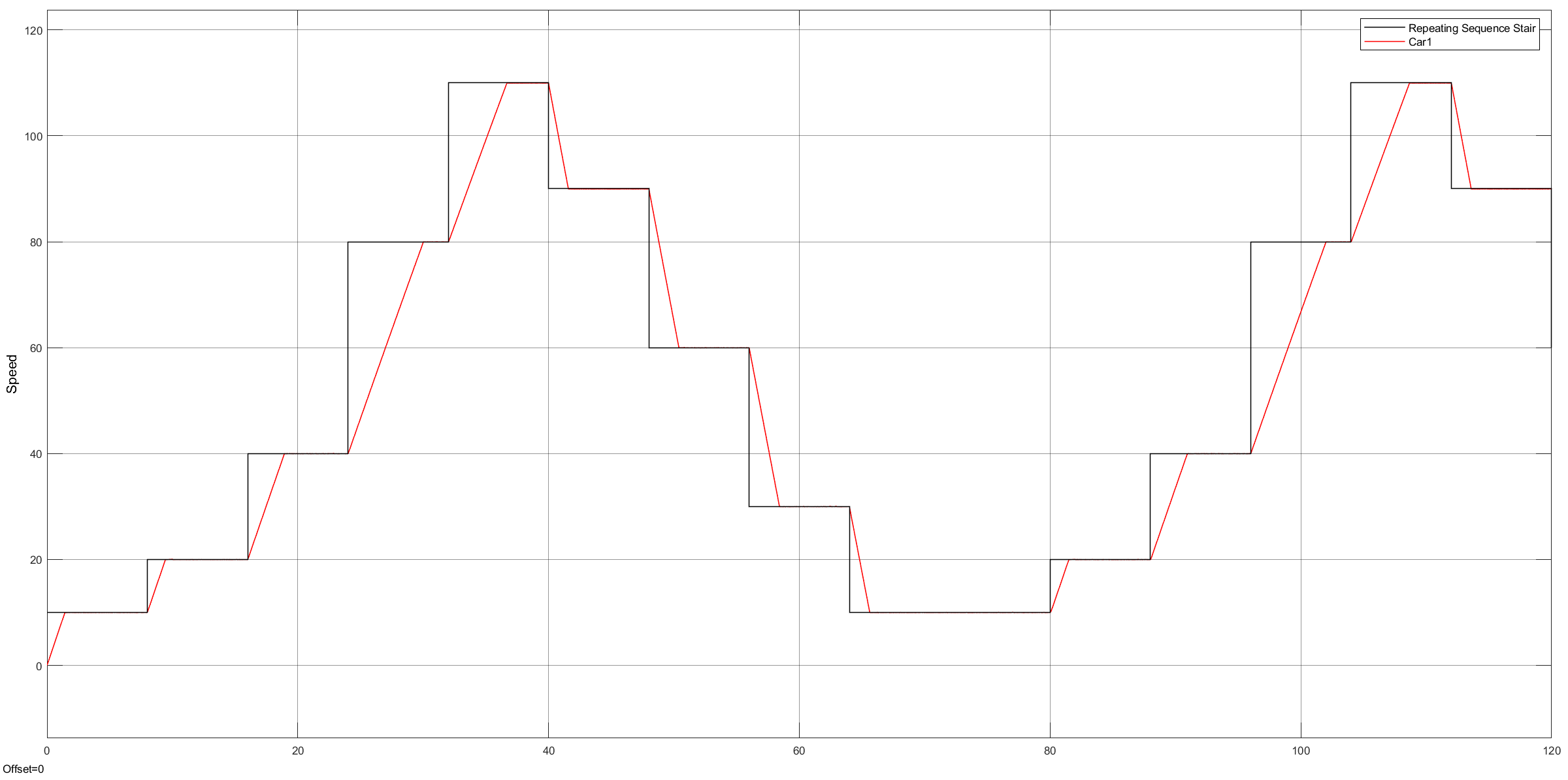


## Fuzzy P Controller design for an average car - Optimized (Triangular Membership functions)

### Flat road scenario

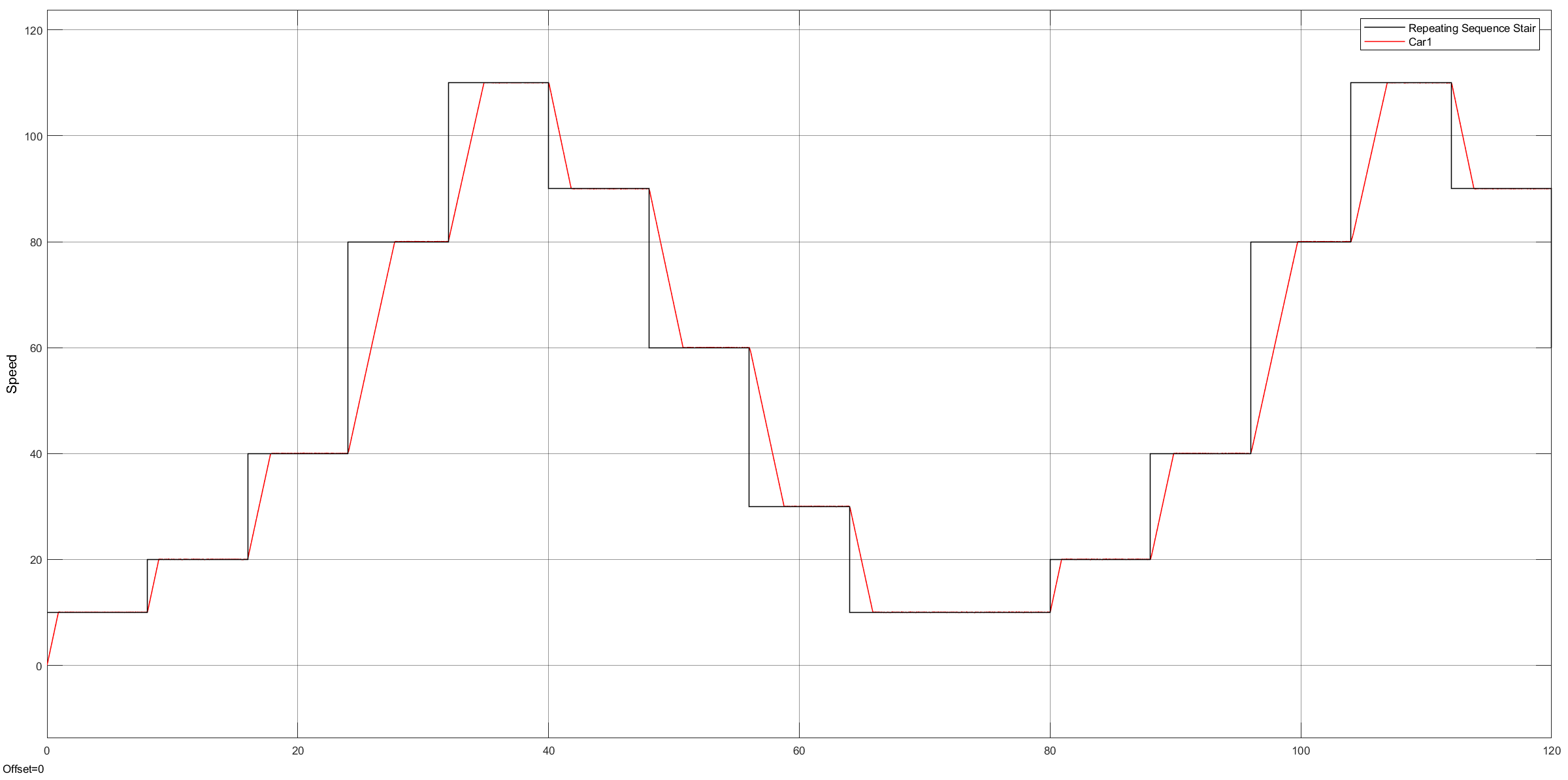


### Uphill scenario

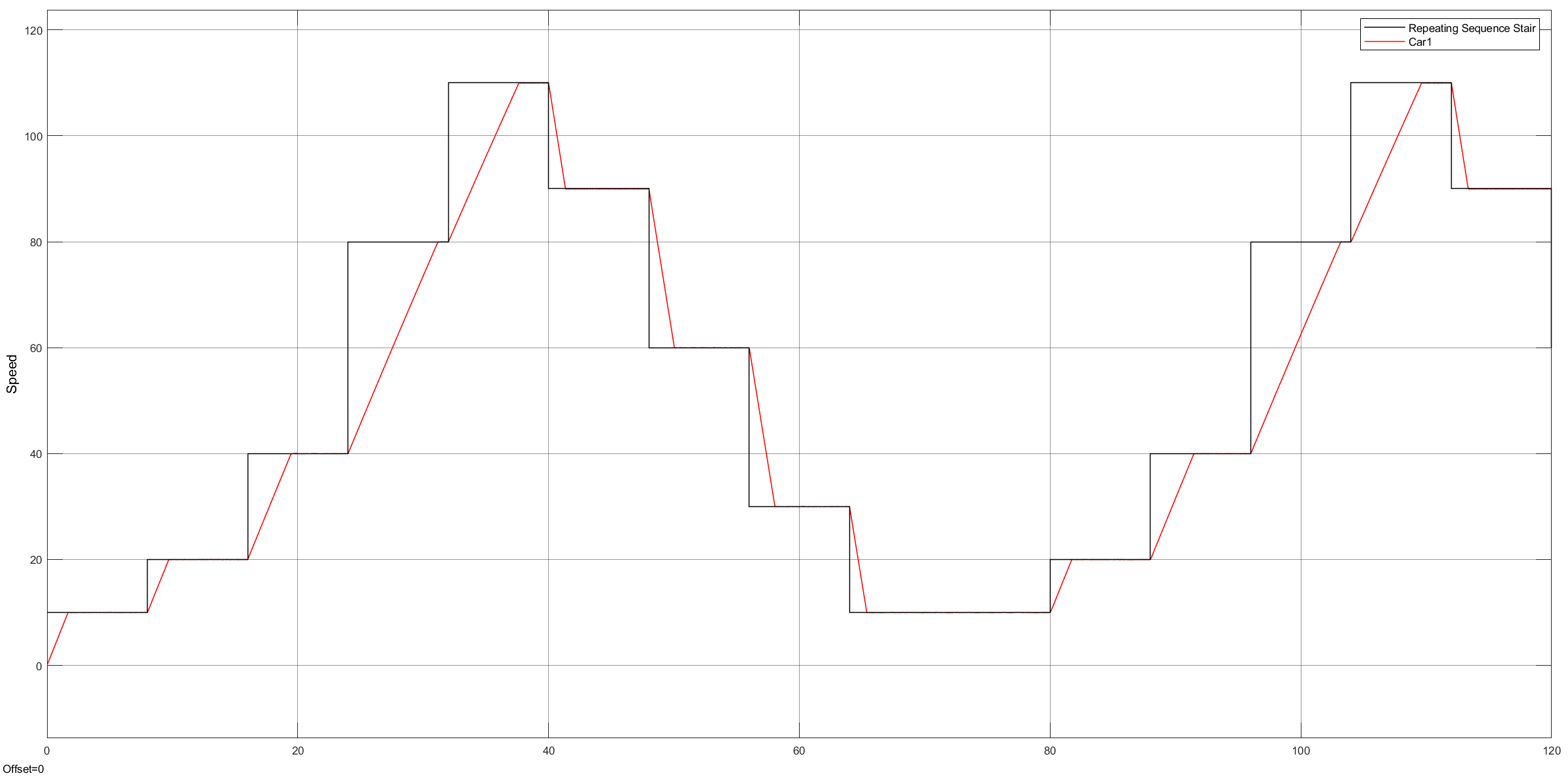


## Fuzzy P Controller design for an average car (Gaussian Membership functions)

### Flat road scenario

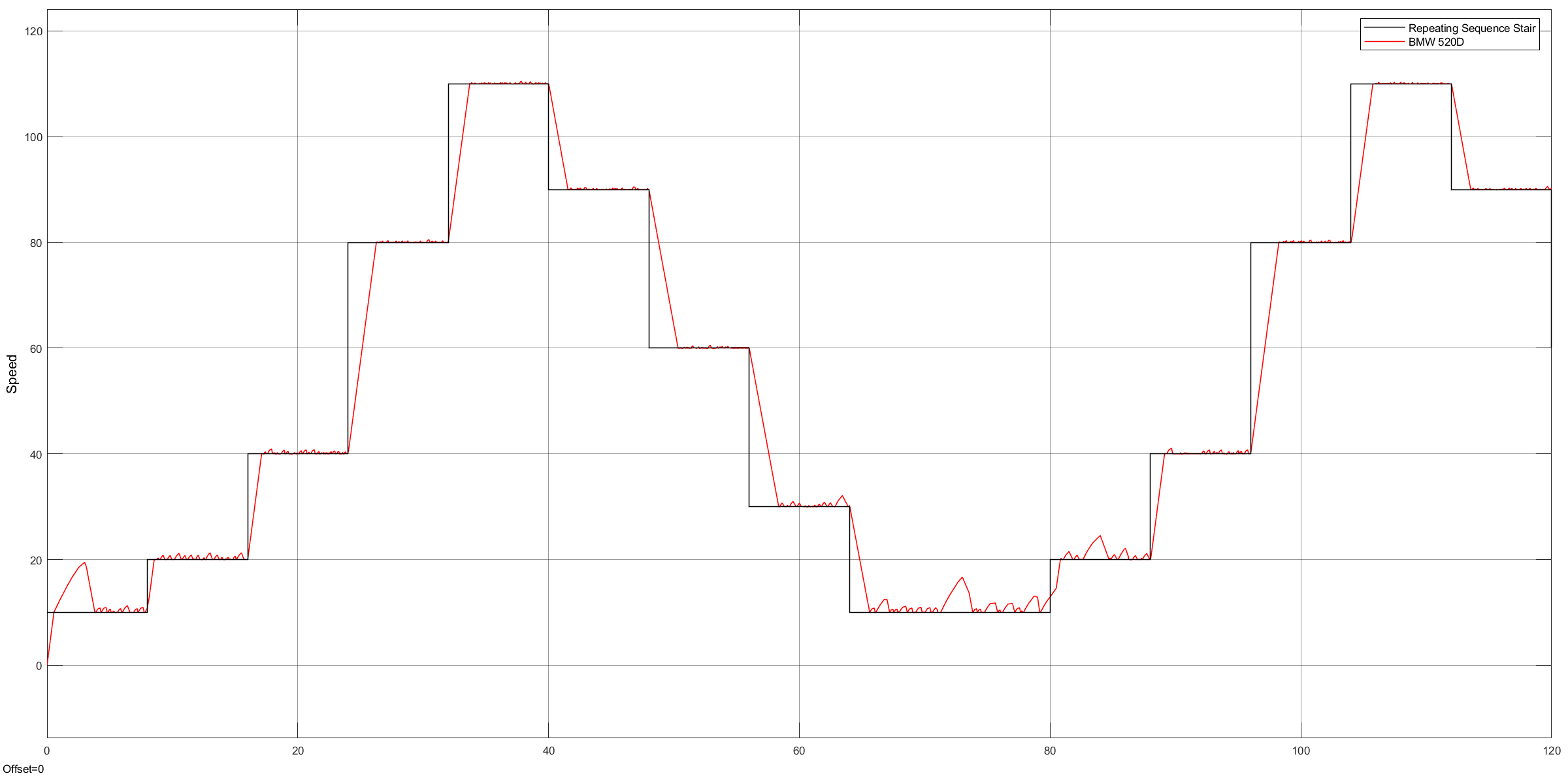


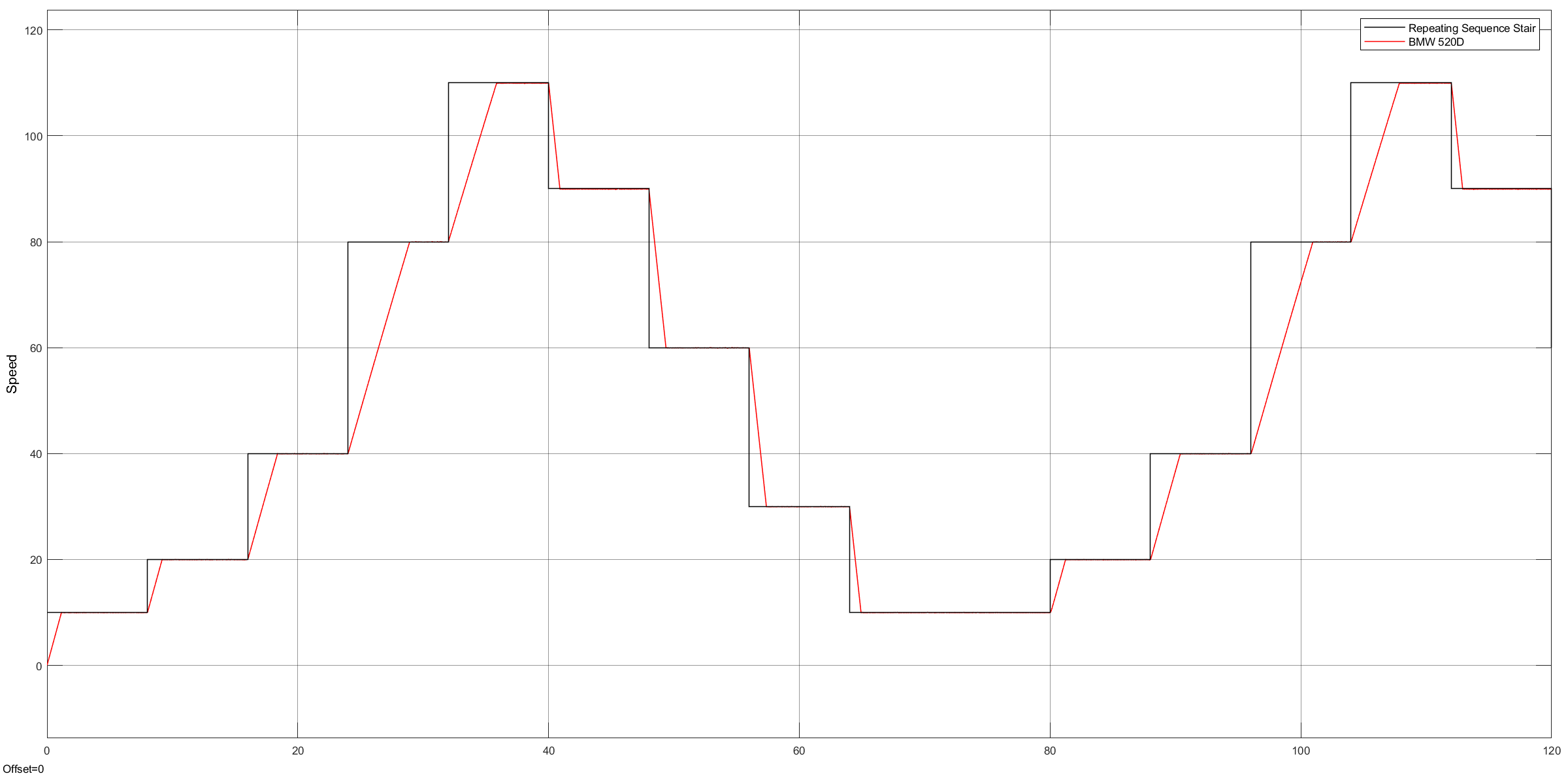
### Uphill scenario



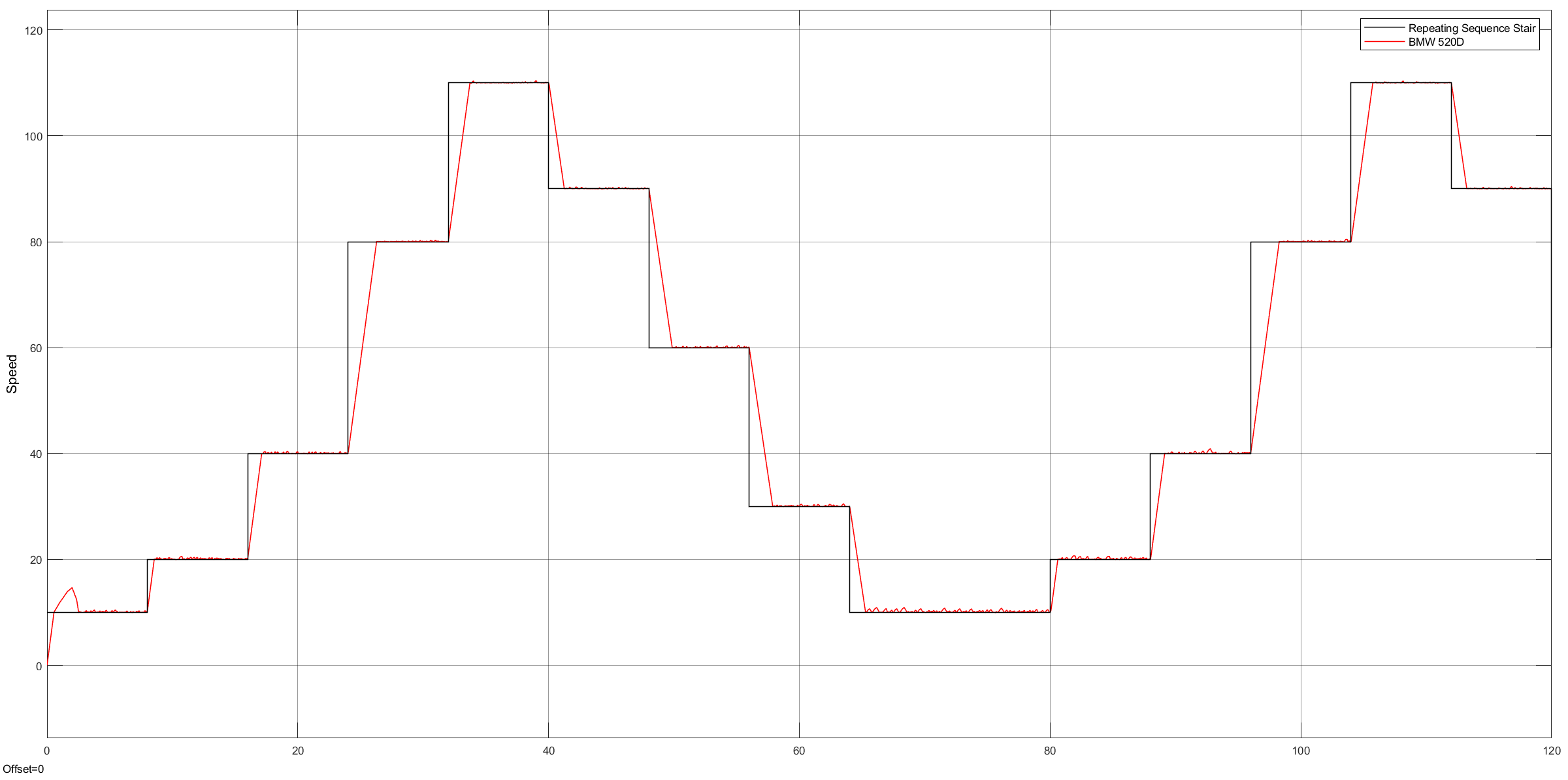
## Fuzzy P Controller design for BMW 520D (Gaussian Membership functions)

### Flat road scenario

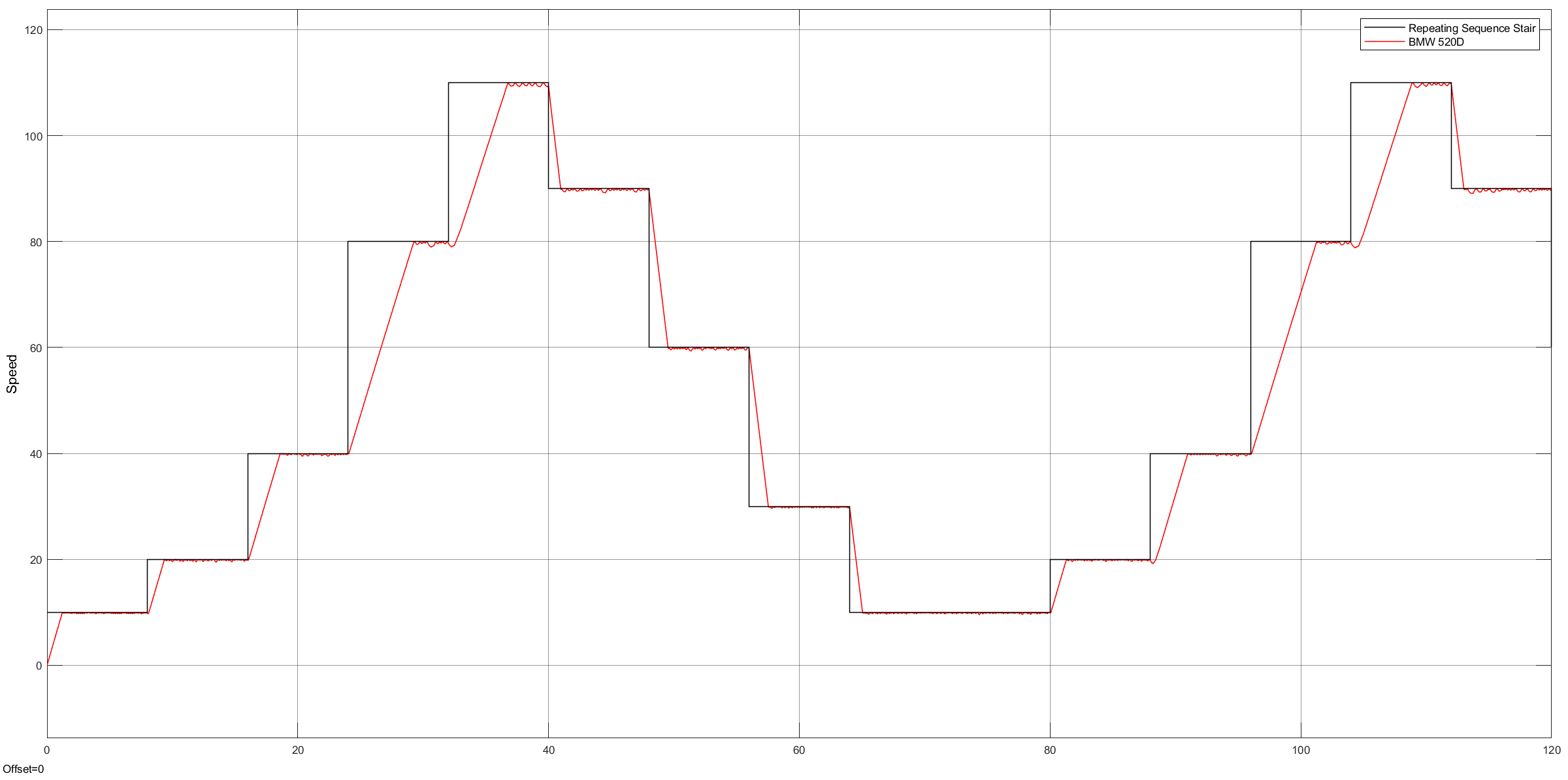


Uphill scenario

## Fuzzy P Controller design for BMW 520D (Triangular Membership functions)

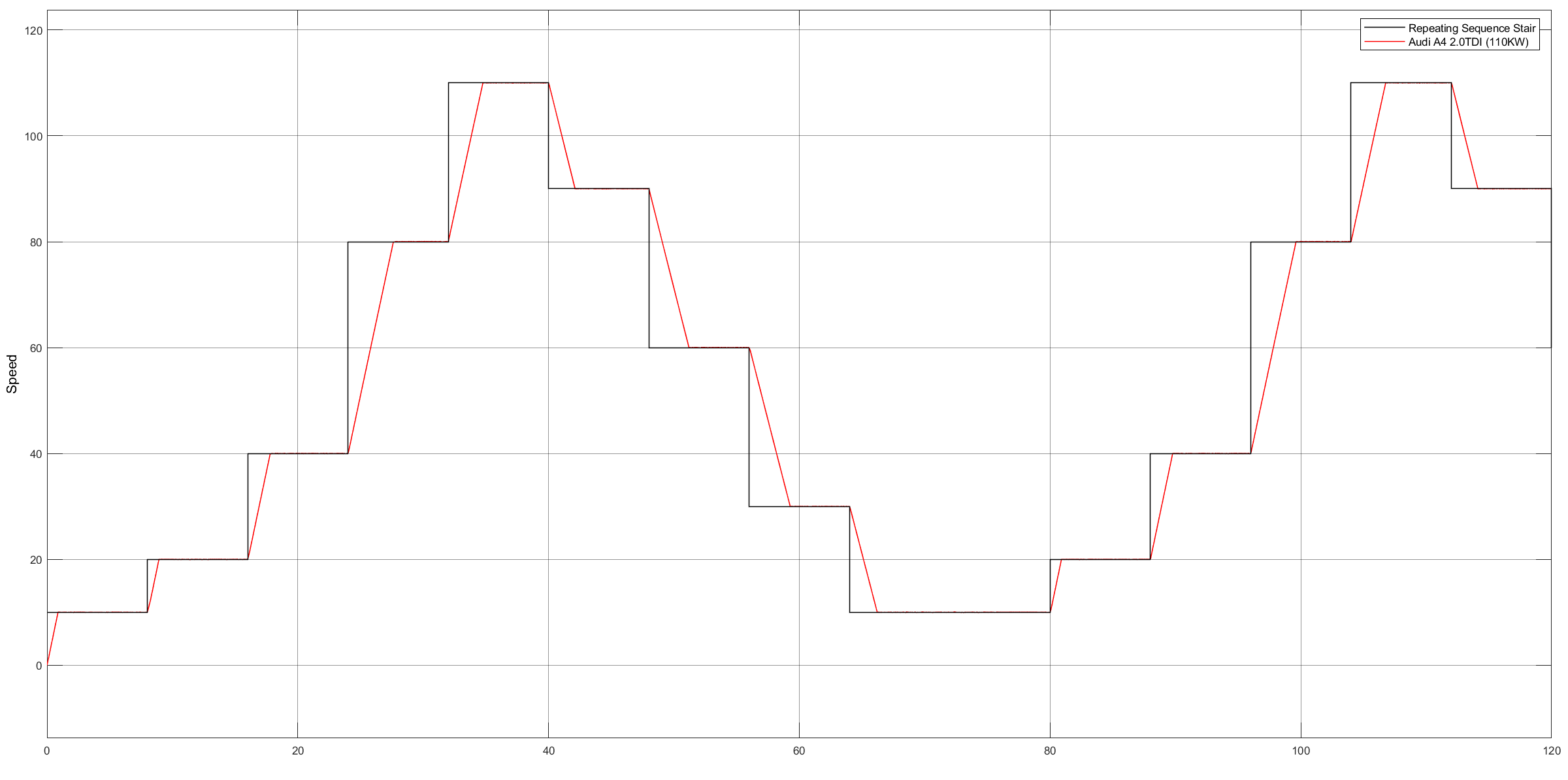
Flat road scenario

### Uphill scenario

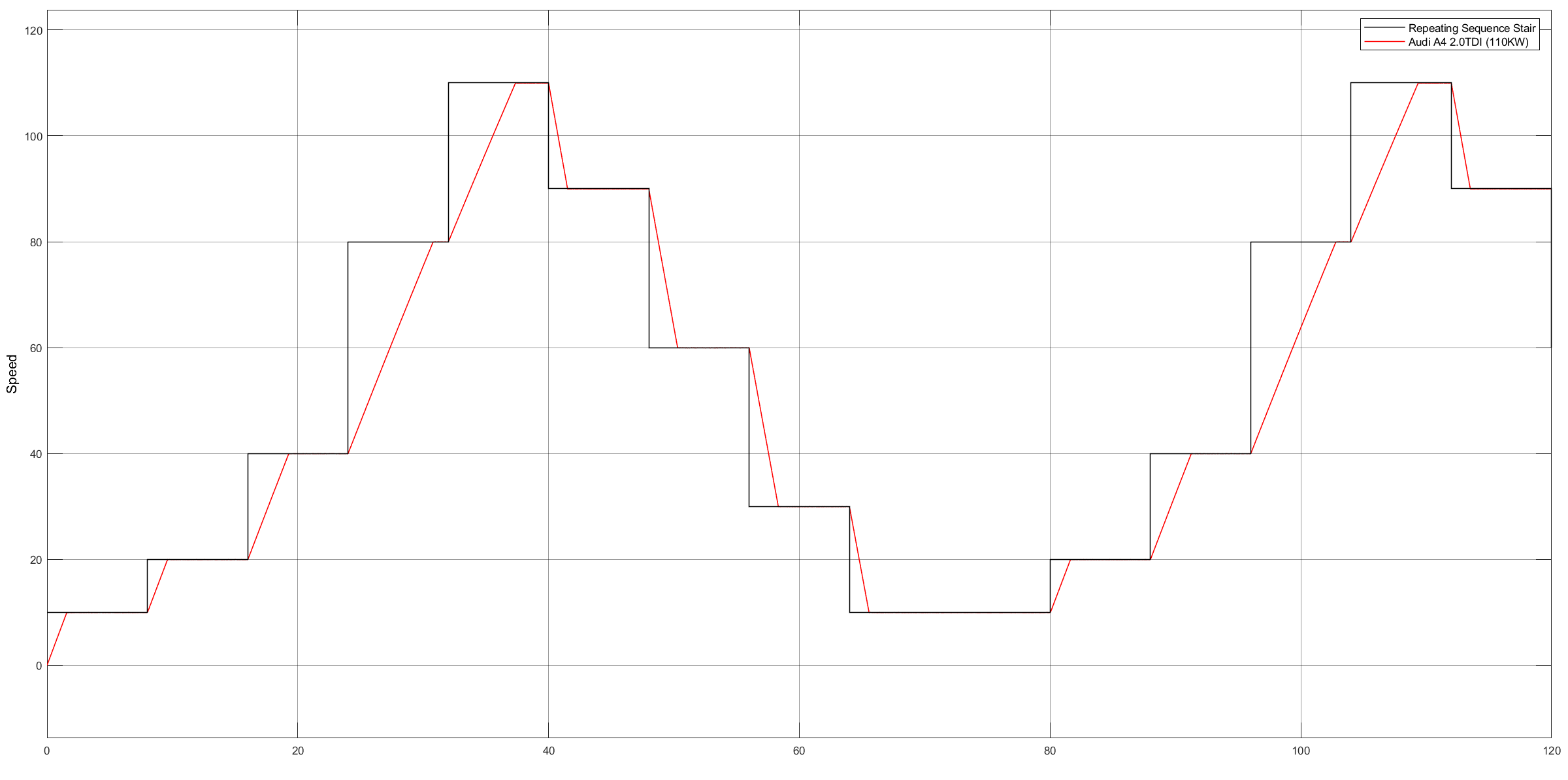


## Fuzzy P Controller design for Audi A4 2.0 TDI (Triangular Membership functions)

Flat road scenario

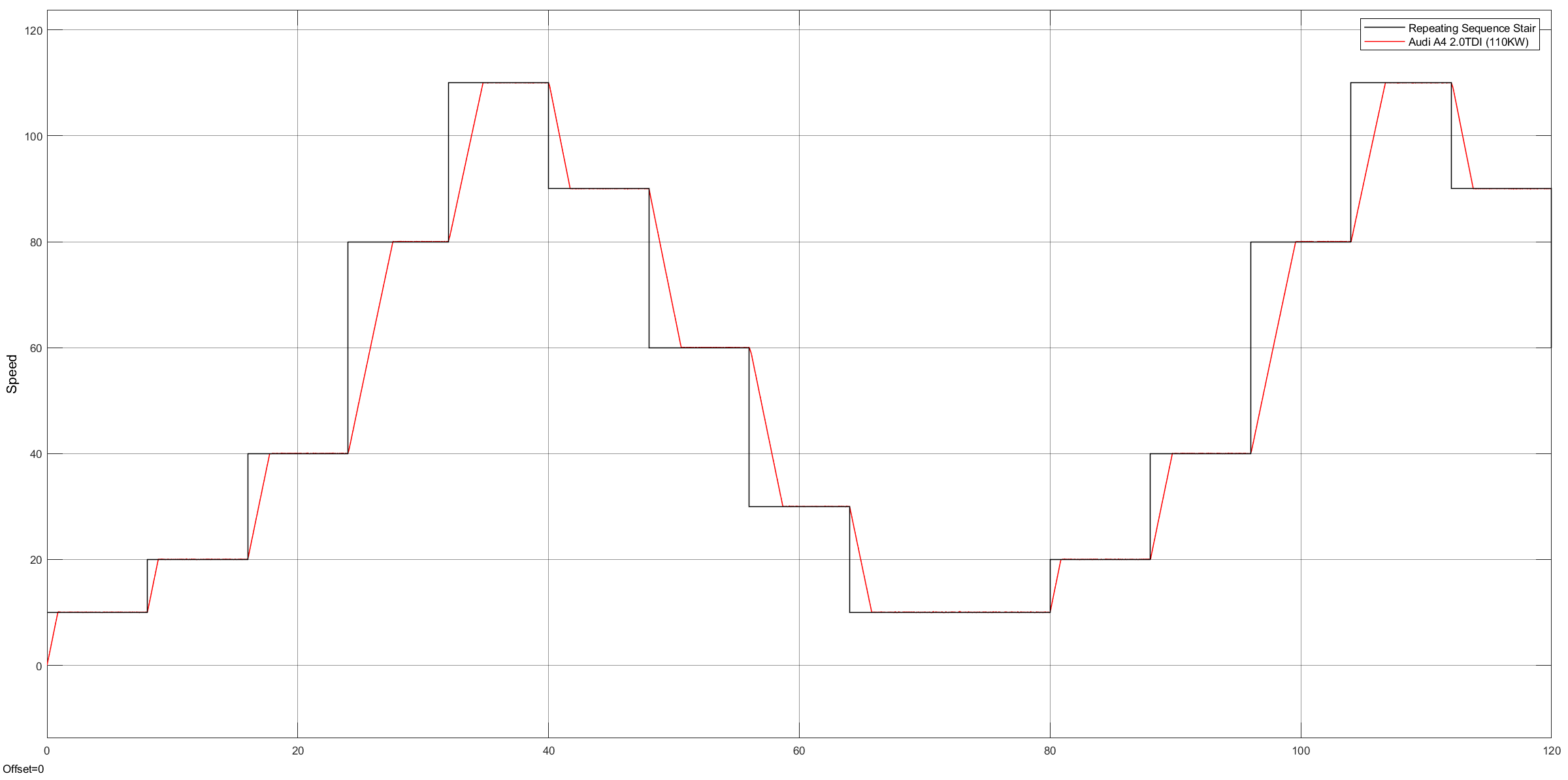


### Uphill scenario

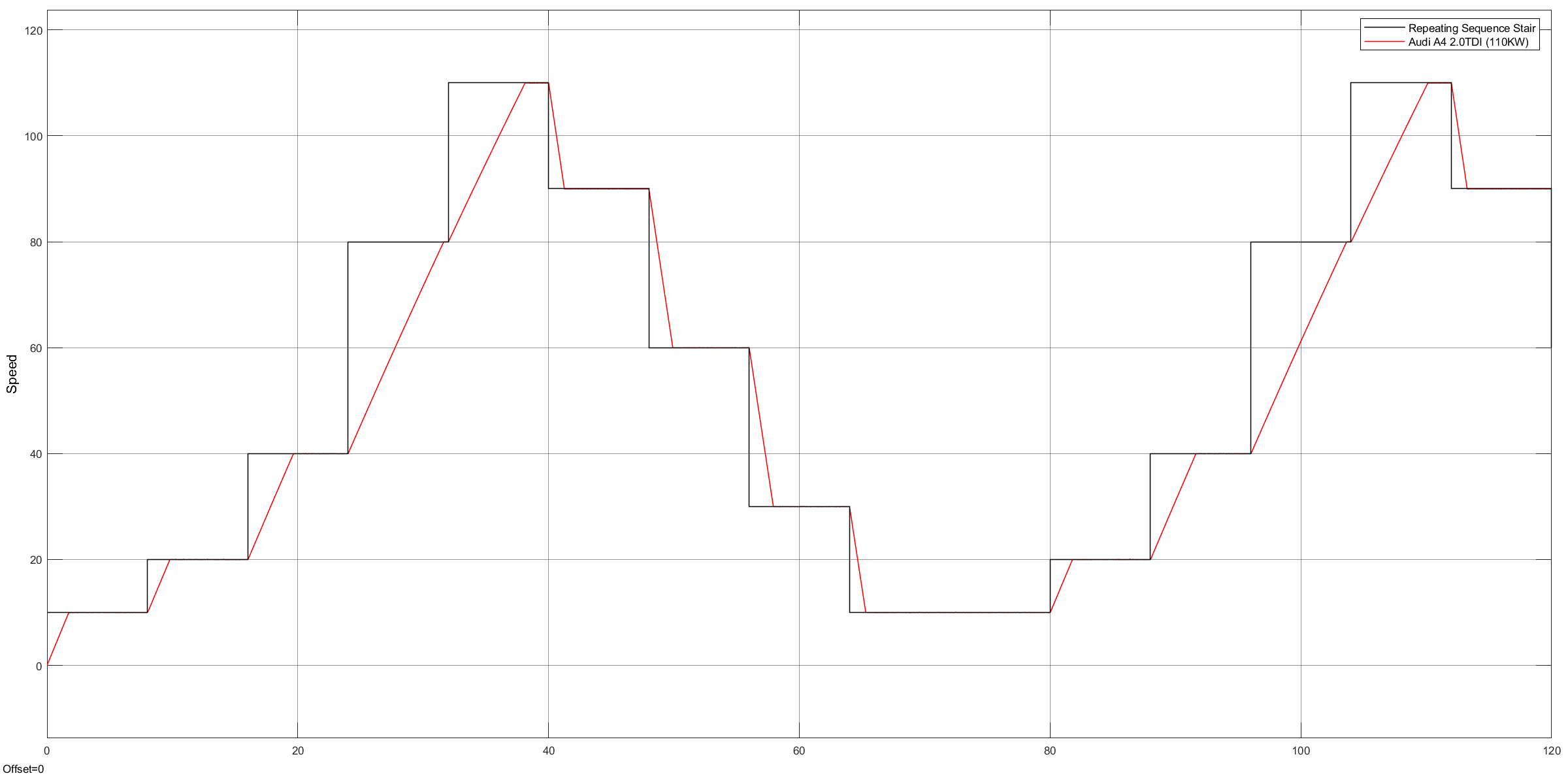


## Fuzzy P Controller design for Audi A4 2.0 TDI (Gaussian Membership functions)

Flat road scenario



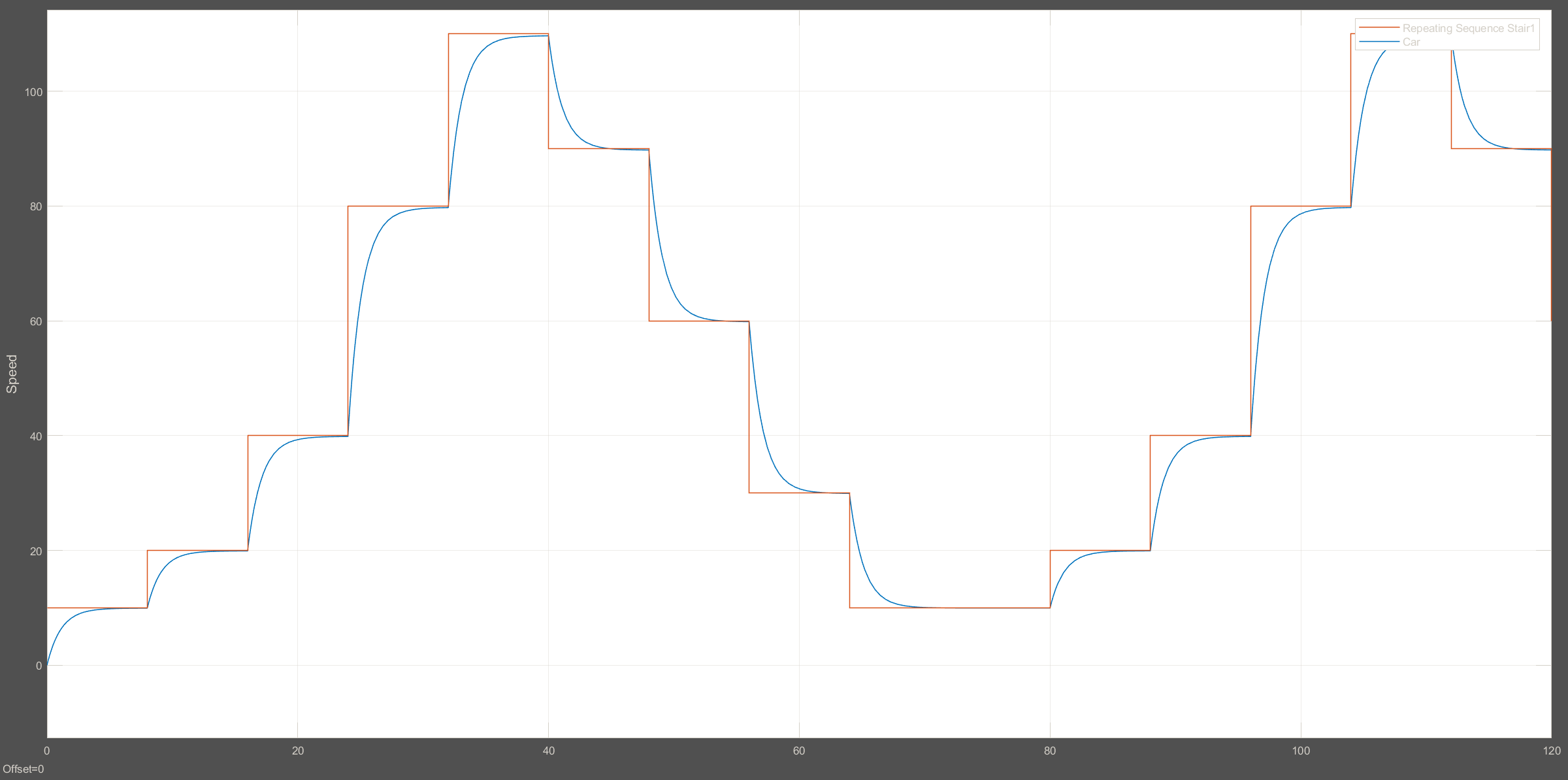
### Uphill scenario



PID Controller in average car

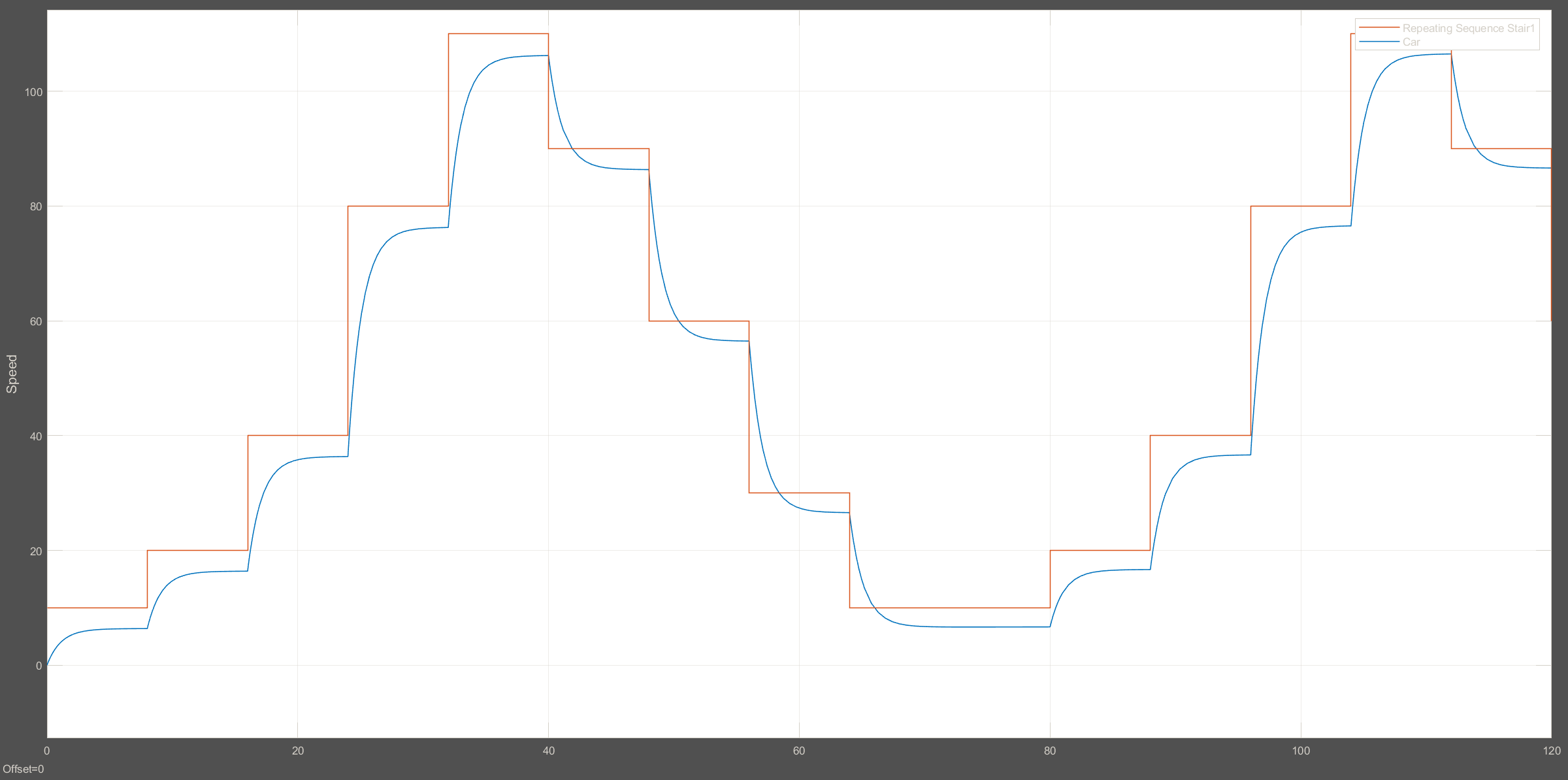
### Flat road scenario

[Kp, Ki, Kd] = [900, 1, 5]

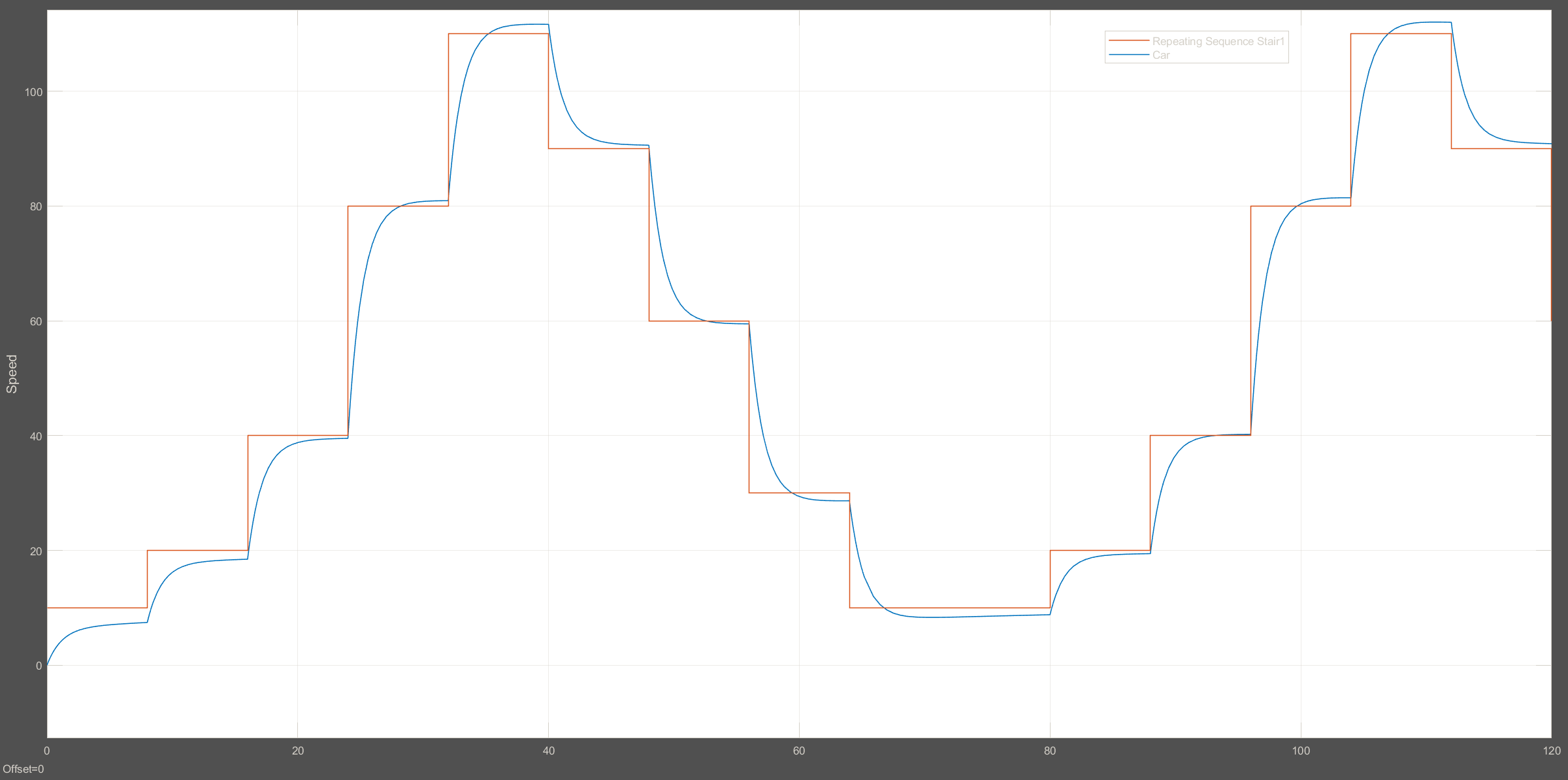


### Uphill Scenario

[Kp, Ki, Kd] = [900, 1, 5]



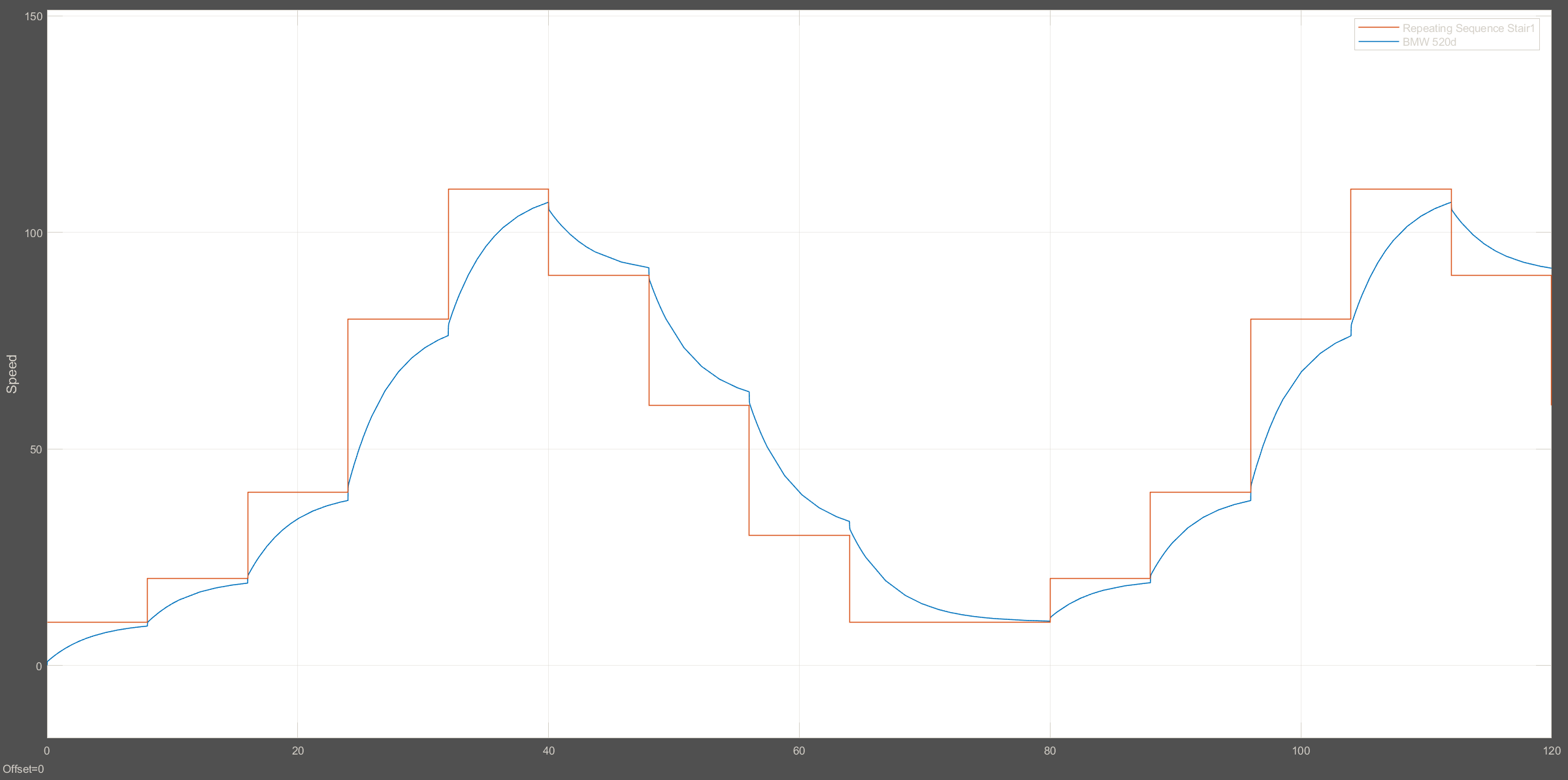
[Kp, Ki, Kd] = [900, 35, 5]



PID Controller design for BMW 520D

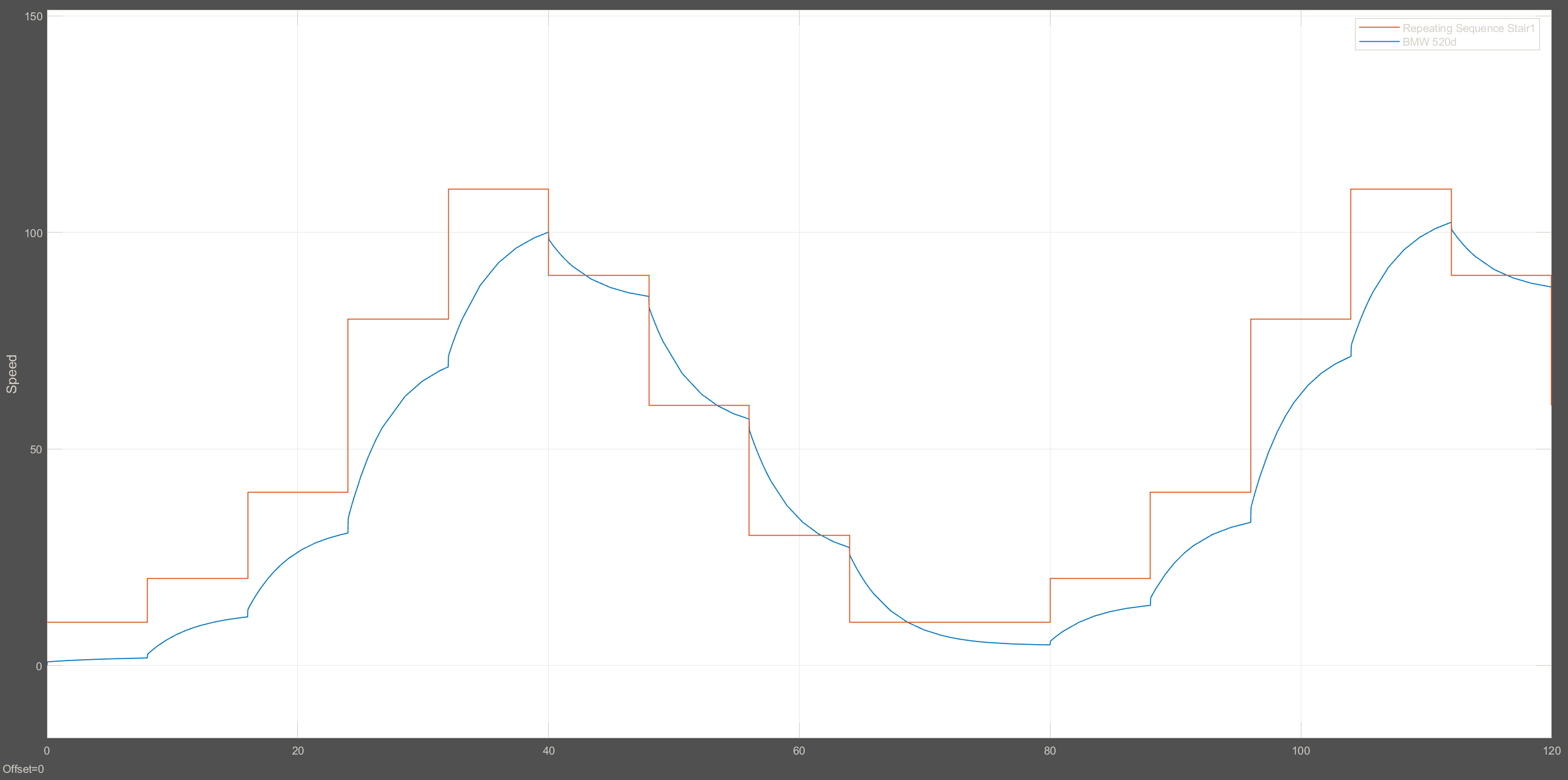
### Flat road scenario

[Kp, Ki, Kd] = [178, 1, 50]



### Uphill Scenario

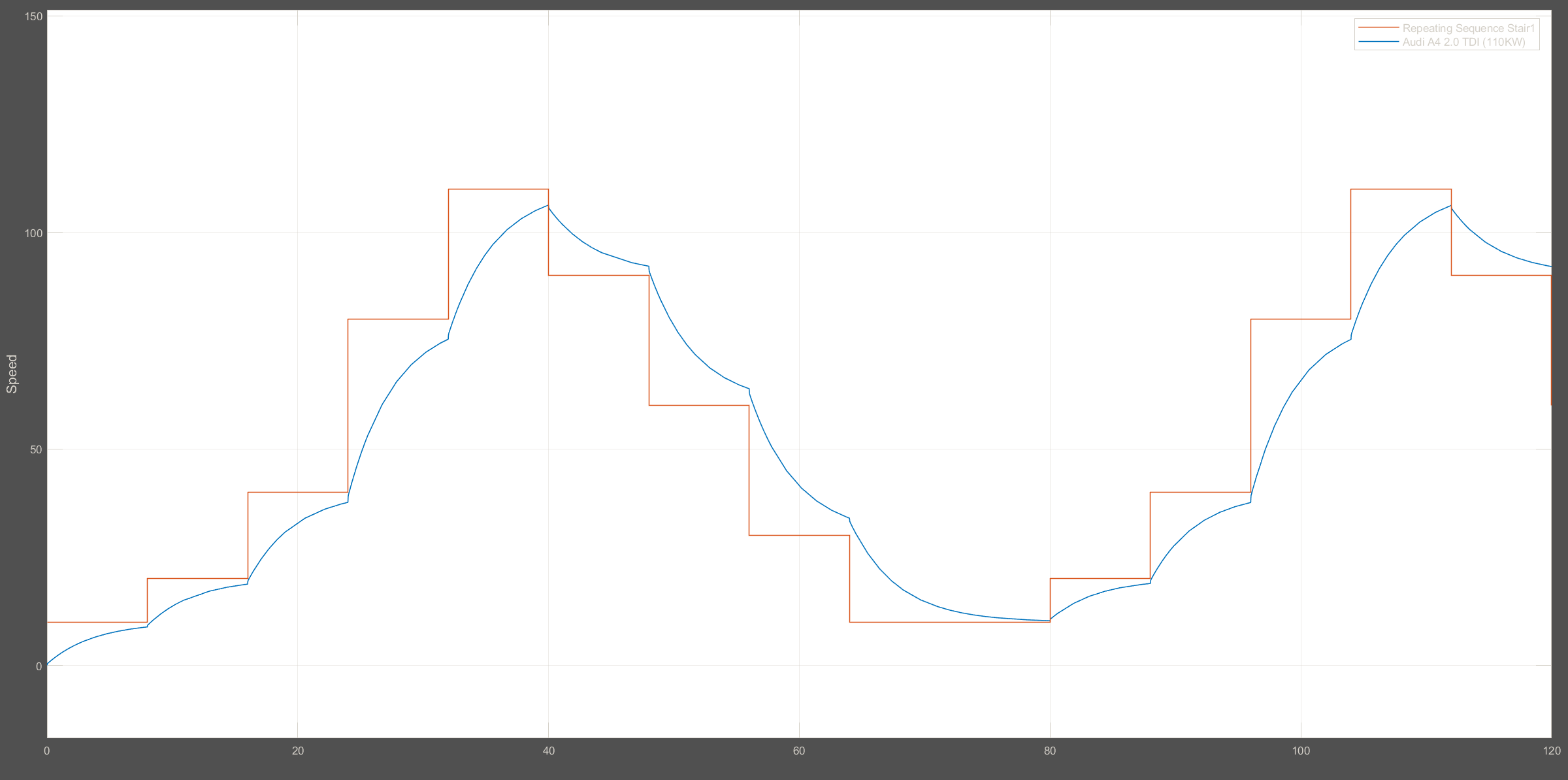
[Kp, Ki, Kd] = [178, 1, 50]



PID Controller design for Audi A4 2.0 TDI

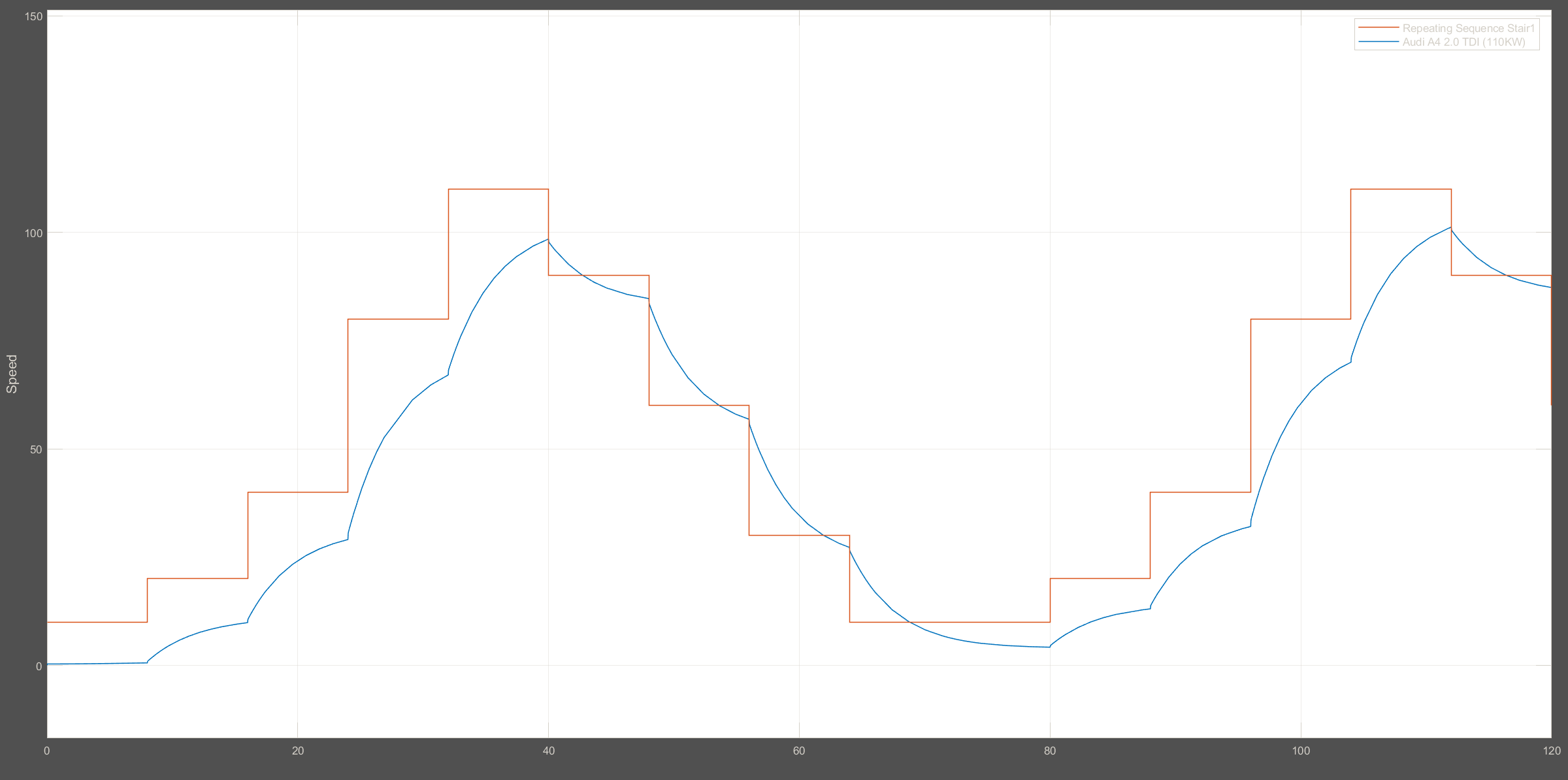
### Flat road scenario

[Kp, Ki, Kd] = [165, 1, 20]



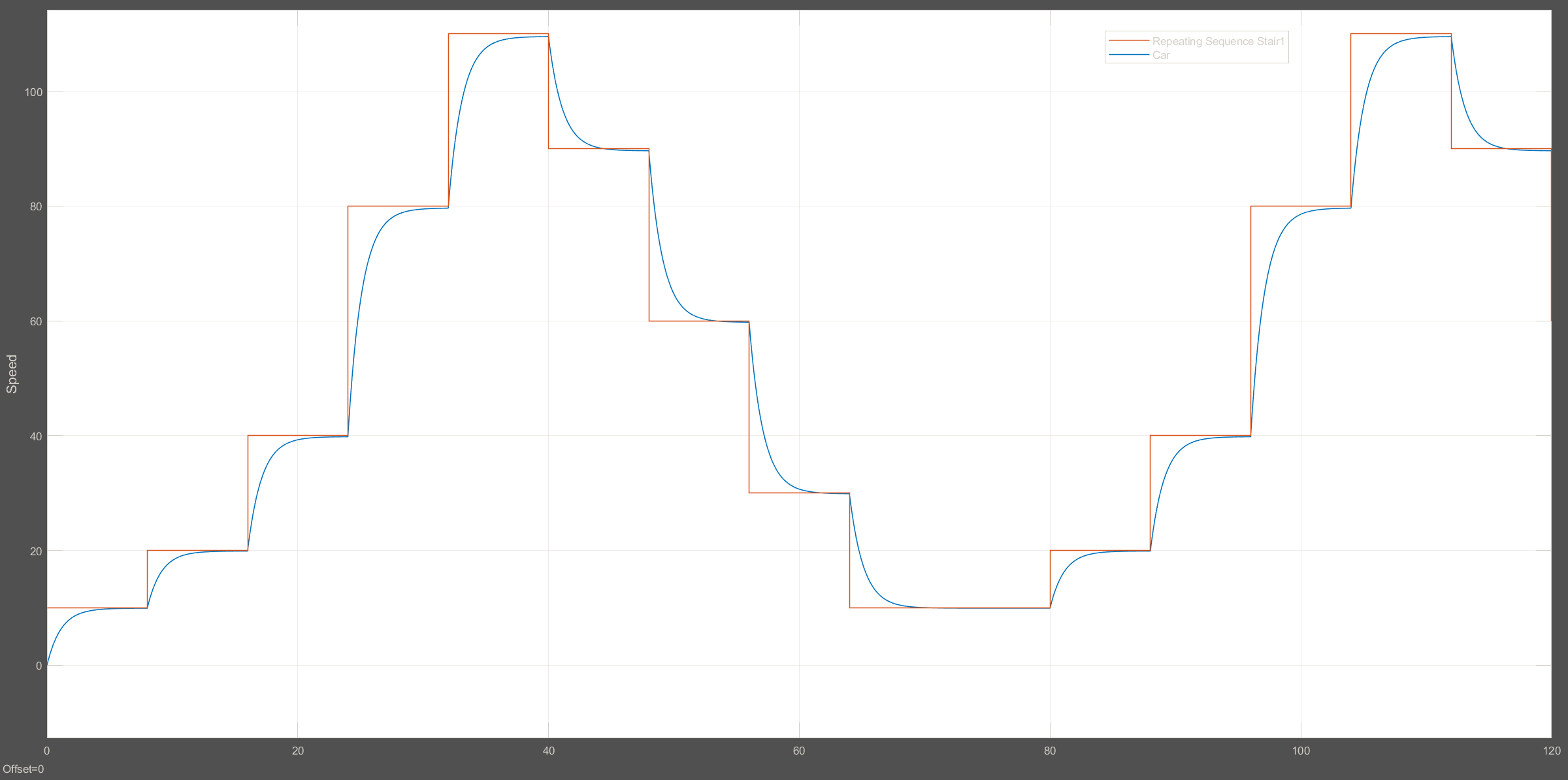
### Uphill Scenario

[Kp, Ki, Kd] = [165, 1, 20]



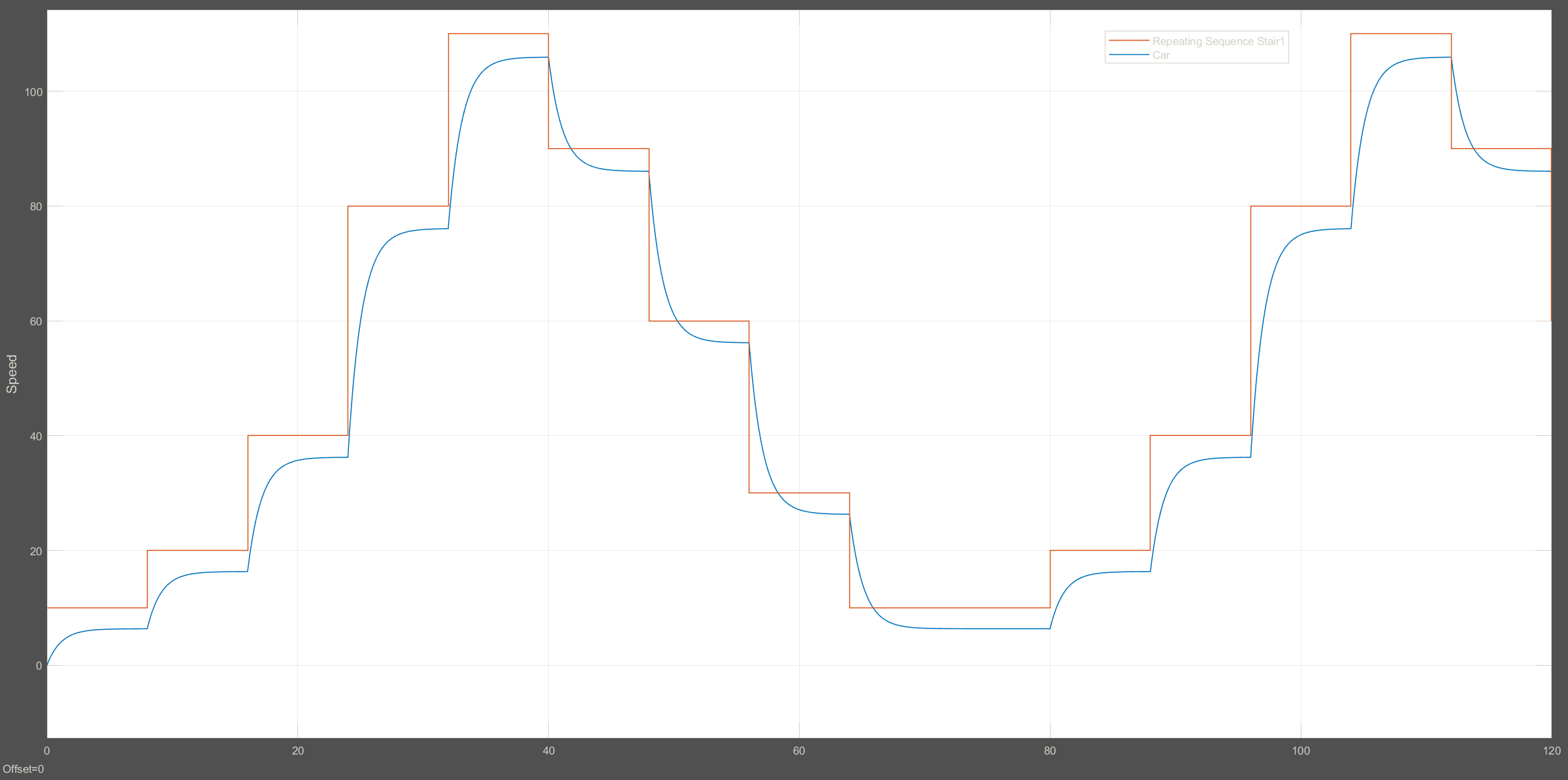
## PD Controller design for an average car

### Flat road scenario



### Uphill scenario

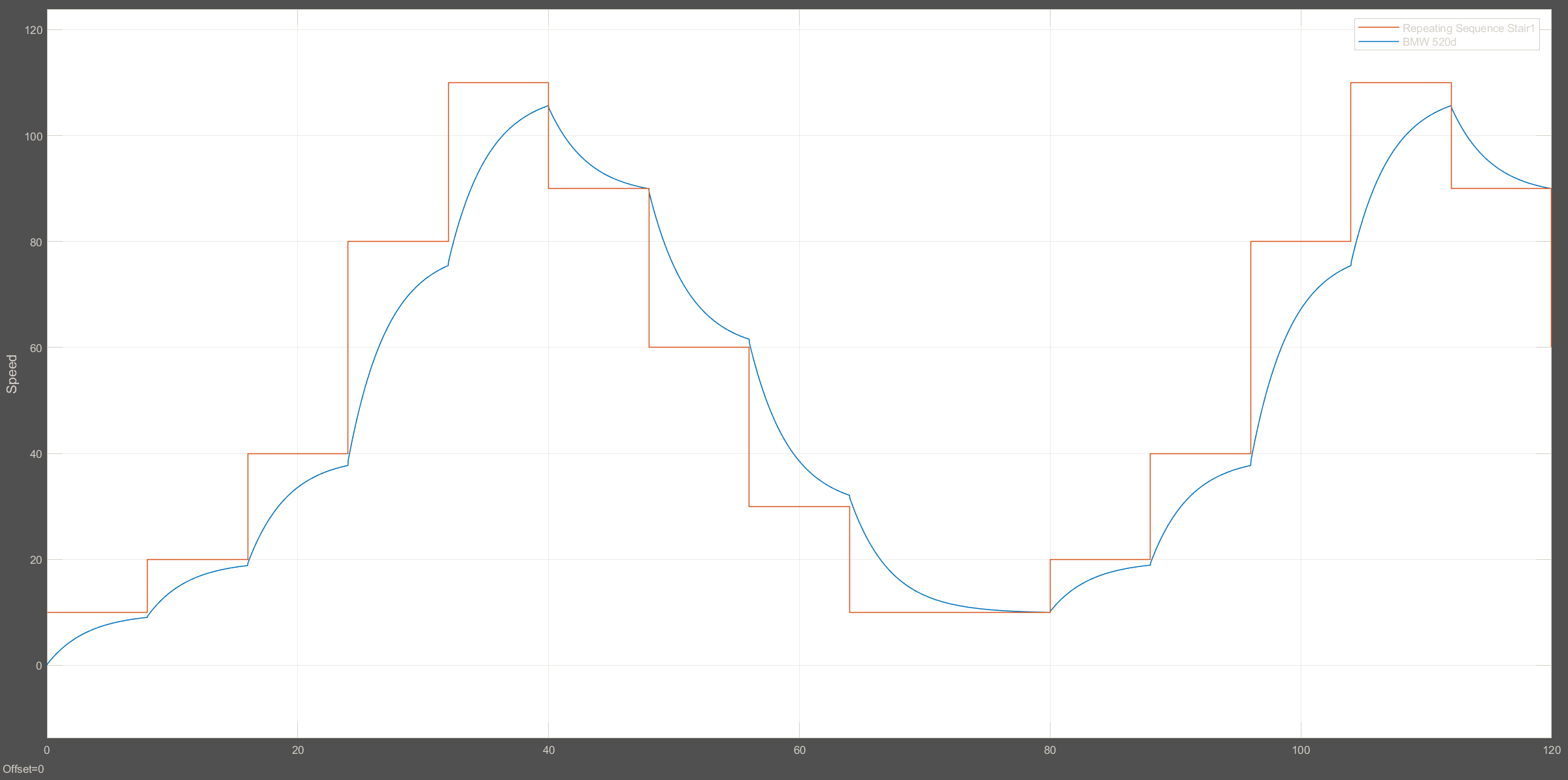
[Kp, Kd] = [900, 5]



PD Controller design for BMW 520d

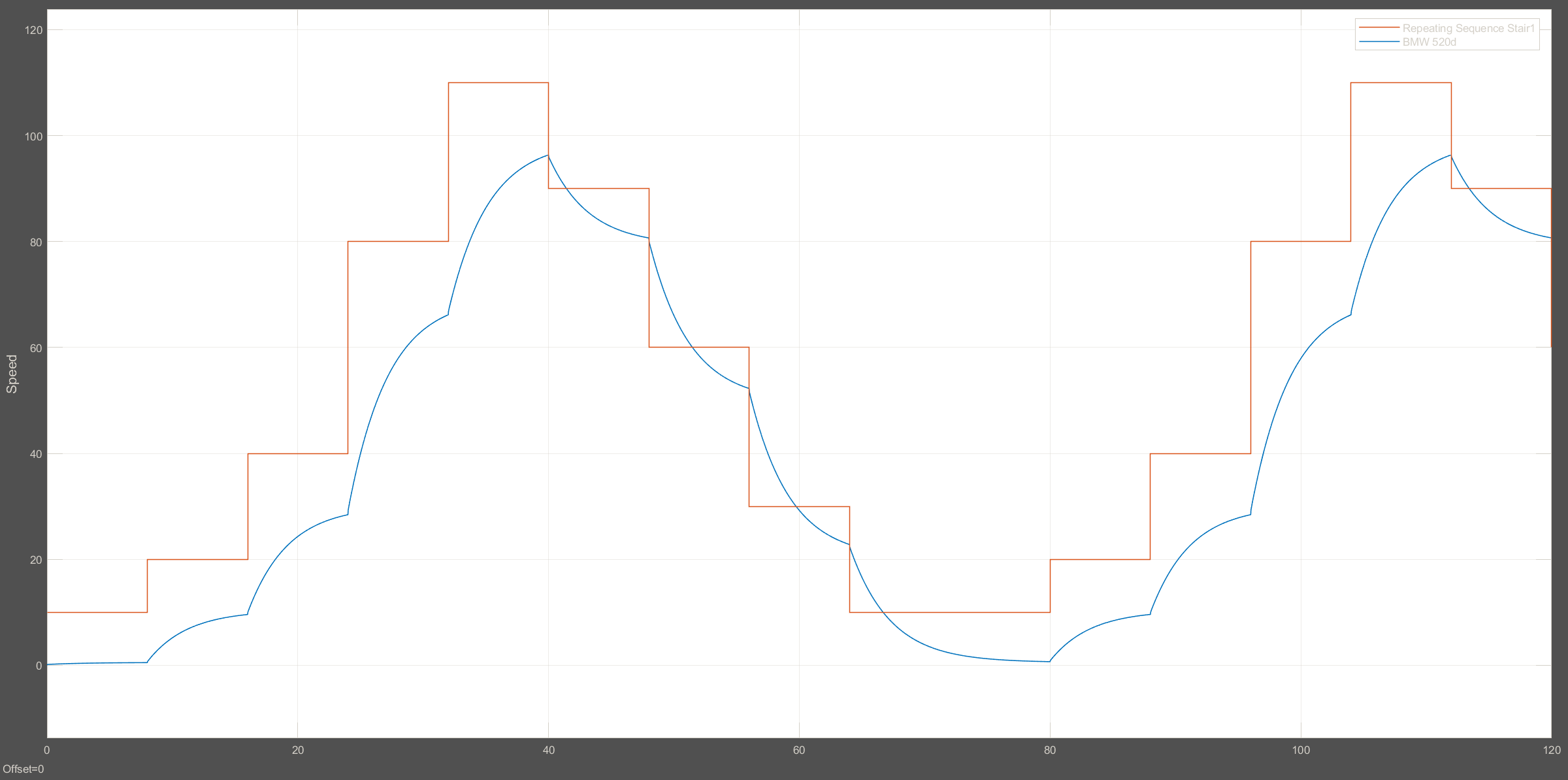
### Flat road scenario

[Kp, Kd] = [180, 10]



### Uphill scenario

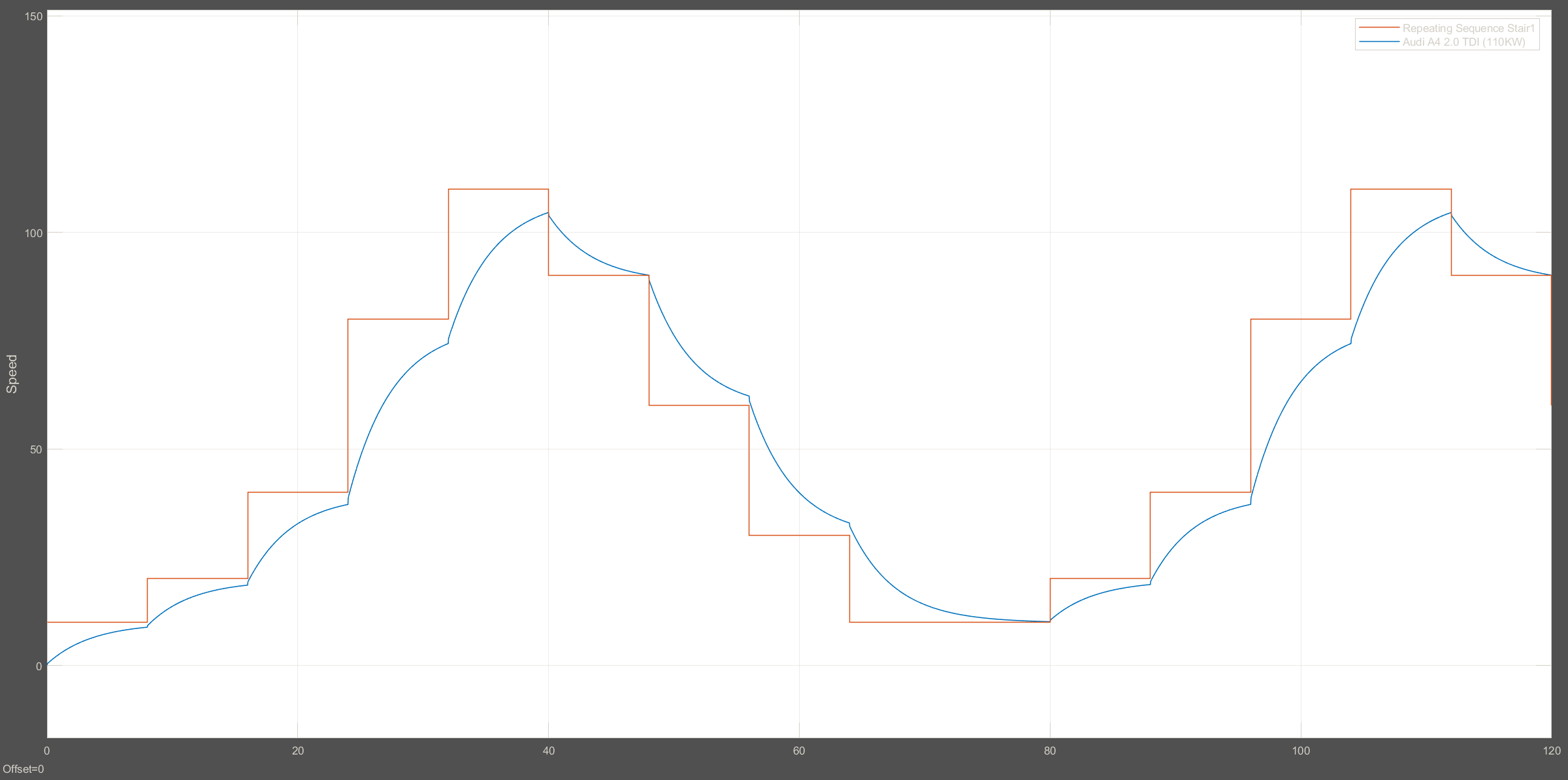
[Kp, Kd] = [180, 10]



PD Controller design for Audi A4 2.0 TDI

### Flat road scenario

[Kp, Kd] = [170, 20]



### Uphill scenario

[Kp, Kd] = [170, 20]

