TCP Congestion control report

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Brainstorming

Purpose:

Explore different AIMD

Test metrics:

Responsiveness and Smoothness

Fairness

Efficiency

High speed TCP

Modified HSTCP

TCP Vegas

TCP Reno

# Introduction

In this report, I aim to explore the Adaptive Increase Multiplicative Decrease (AIMD) mechanism of TCP, focusing on tuning its parameters for optimal performance in high-speed networking data center environments. The report includes an exploration of AIMD parameters, numerical experiments, and discussions based on the results obtained.

# AIMD Parameter exploration

Linear approach

First, we tried the common AIMD algorithm.

Number of steps = 50

= 12

User 1: User 2

Initial x: 1 Initial x: 10

AI: AI:

MD: MD: A graph with orange dots and lines

Description automatically generated

As expected, we can see that the graph is shifting towards the fairness line. In addition, it is going above the efficiency line at the end.

However, it is possible to add bias towards a user. For instance, by increasing the multiplicative decrease and decreasing the additive increase, we can favor against user 1.

User 1: User 2

Initial x: 1 Initial x: 10

AI: AI:

MD: MD:

A graph with orange lines and dots

Description automatically generated

As we can see, the lines converge closer to user 1.

Non-linear approach

For reference, I tried the sample tutorial answer.

User 1: User 2

Initial x: 1 Initial x: 10

AI: AI:

MD: MD:

A graph with orange lines and dots

Description automatically generated

A graph with lines and dots

Description automatically generated

# Numerical Examples and Experiments

# Conclusion

# Appendix