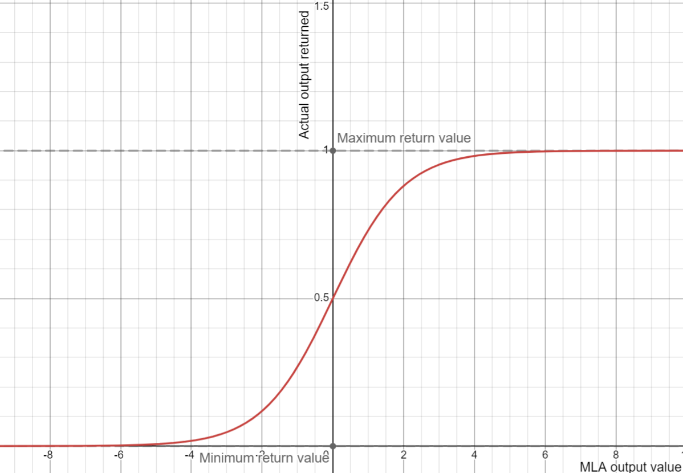
Summary

E1: E1 Evaluation of the research processes used, specific to the research question (500 words)

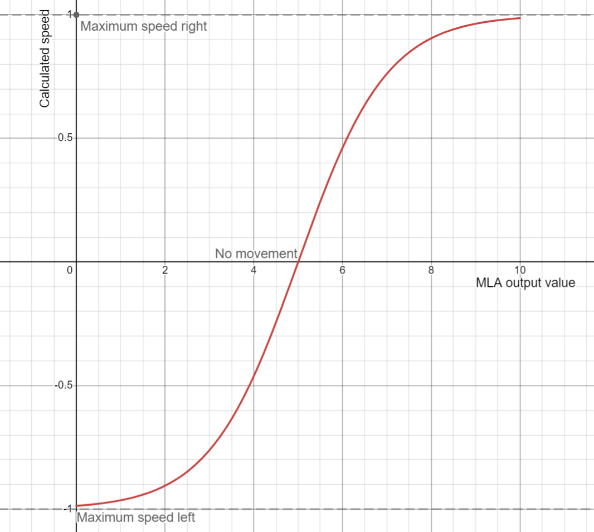
E2: E2 Evaluation of decisions made in response to challenges and/or opportunities specific to the research processes used. (500 words)

Challenge: Action research investigating subquestion 3 (How can I choose and design the various functions of, and apply an MLA into my chosen cart pendulum simulation)

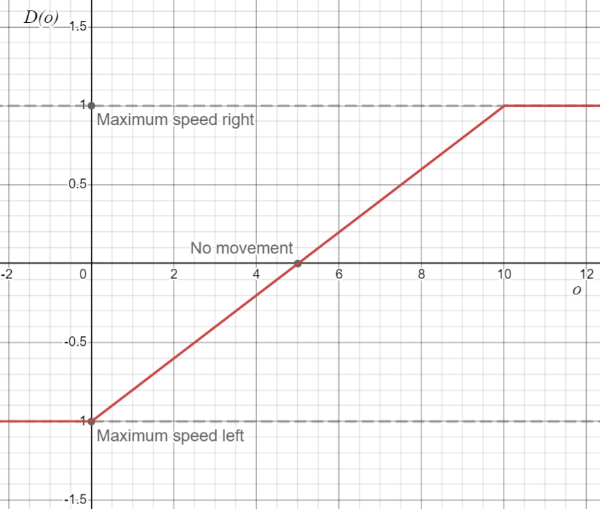


*Figure 1 – Graph showing the MLA calculated output value compared to the actually returned output*

During my research, I had applied an MLA into my physics simulation, however while researching the decision function in subquestion 3 I had misconstructed it several times. The function (where is the decision and is the MLA output) is supposed to move the cart left with a negative input, and the cart right on a positive input. The MLA I had designed uses a ReLu function (also called a sigmoid function, ) to return , which can only return a positive number between 0 and 1 (*figure* 1) meaning the cart can only move right. The function I used was , meaning that returns different speeds instead of just for the speed limits. However, since , the desicion range is . The second iteration had the function , meaning it had an decision range of , which means the cart can only ever move at half of its maximum speed. I solved this problem by changing the decision function a third time to (*figure 2*), which means that it has a decision range of . When the ReLu and decision functions are graphed as for we get the graph found in figure 3, which shows the final speed curve of the MLA output. We graph only because the MLA cannot return values beyond this value. Changing and iterating through these different functions was a good decision as they helped me understand how the algorithms work more thoroughly. By making these changes, the MLA can actually move left and right correctly in order to balance the pendulum.



*Figure 3 – Graph showing the calculated speed from actual MLA output that the code returns*



*Figure 2 – Graph showing the decision function of the final MLA*

Opportunity:

E3 Evaluation of the quality of the research Outcome (500 words)