ELL333 HOMEWORK MARKS = 14

Q. The aim of this homework is to investigate the phenomenon of 'self-stability' in bicycle dynamics using concepts discussed in the lectures. Examples of this phenomenon can be viewed using the Videos 1, 2, and 3 on the website http://bicycle.tudelft.nl/yellowbicycle/.

a) Calculate the eigenvalues of the linearized dynamics of a bicycle model and plot their dependence on the bicycle velocity. Use the model given in the preprint (~Pg 1968) of the website http://bicycle.tudelft.nl/benchmarkbicycle/. Identify the range of velocities where these dynamics are self-stable.

b) To increase the range of velocities where the bicycle is self-stable, how could you modify the bicycle design.

As a starting point for related material, the TED talk linked on this website http://bicycle.tudelft.nl may be helpful.

Policy

1. Discussion with other students/TAs is encouraged.

2. Each student should submit their own homework report. The report should reflect the student's own understanding at the time of submission. It may contain relevant figures. Any code written should be included. Any other material used should be referenced.

3. This homework is due on 31.10.2018. It is to be submitted via moodle.

4. For late submissions, unless these are unavoidable, one mark may be deducted for each day that the submission is late.