**Read me file:**

**University of Southampton – ISVR FEE – BO DING – B.DING@soton.ac.uk**

**The excel file contains data for the paper. In particular:**

Figure 4. Wheel, rail and contact mobilities: (a) wheel vertical and vertical-to-lateral cross mobility, (b) rail and contact vertical mobilities.

Figure 5. Stability analysis of model including rail dynamics in frequency domain: (a) Nyquist locus; (b) modulus of the open loop transfer function. ‘\*’ unstable frequencies

Figure 6. The rail mobilities at point B. Fig.7: the Imaginary part (frequency) and real part (growth rate) for Case 2. The x-label for both subfigures is adhesion coefficient. The y-label is Imaginary part (frequency) and real part (growth rate).

Figure 7. The vertical point mobility at the rail head centre with beam model and WFE model.

Figure 8. Comparison of rail mobility with continuous and discrete support. Fig.10: this figure shows the effect of the damping ratio of the higher frequency mode for two cases. The x-label is adhesion coefficient. The y-label is damping ratio.

Figure 10. The rail point mobilities with and without additional wheels on the track.

Figure 11. The rail mobilities with different pad stiffness: dotted line: soft pad with one layer support; dashed line: soft pad with two layer support; solid line: stiff pad with two layer support.

Figure 13. Eigenvalue results: (a) rail represented as stiffness; (b) rigid rail; (c) rail represented as mass; (d) rail represented as damper.

Figure 14. Amplitude and phase of simplified rail point mobility with different 𝑛𝑛: (a) magnitude; (b) phase.

Figure 15. Stability map for different combinations of 𝛼𝛼 and 𝜇𝜇: solid line: 𝜁𝑤=0.0001; dotted line: 𝜁𝑤=0.001; dashed line: 𝜁𝑤=0.01.