Optimising the energy efficiency of rail vehicles by a novel application of integrated adaptive control method for vehicle traction and active steering systems

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Active wheelsets steering control for railway vehicles travelling around curves

Market requirements
- Facilitate highly efficient movement of passenger and freight.
- Continuous improvement of rolling stock energy and carbon efficiency.
- Reliable, energy efficient, low whole life cost rolling stock.
- Energy efficient drive systems which produce less pollution
- Reduction of tractive energy, peak power demand and the unit costs

Proposed adaptive integrated control for traction and active wheelset systems

Adaptive control method – uses a controller which must adapt the commands depending on variable parameters or uncertainties.

Controller: generates control signals based on command signals, feedback and signals generated by adaptive mechanism.
Adaptive mechanism: applies the proposed control method in order to optimise the operation of controller.
System identification: performs the processing of signals (such as $v, B, \omega, T, \ldots$) which are directly measured from the rail vehicle.