

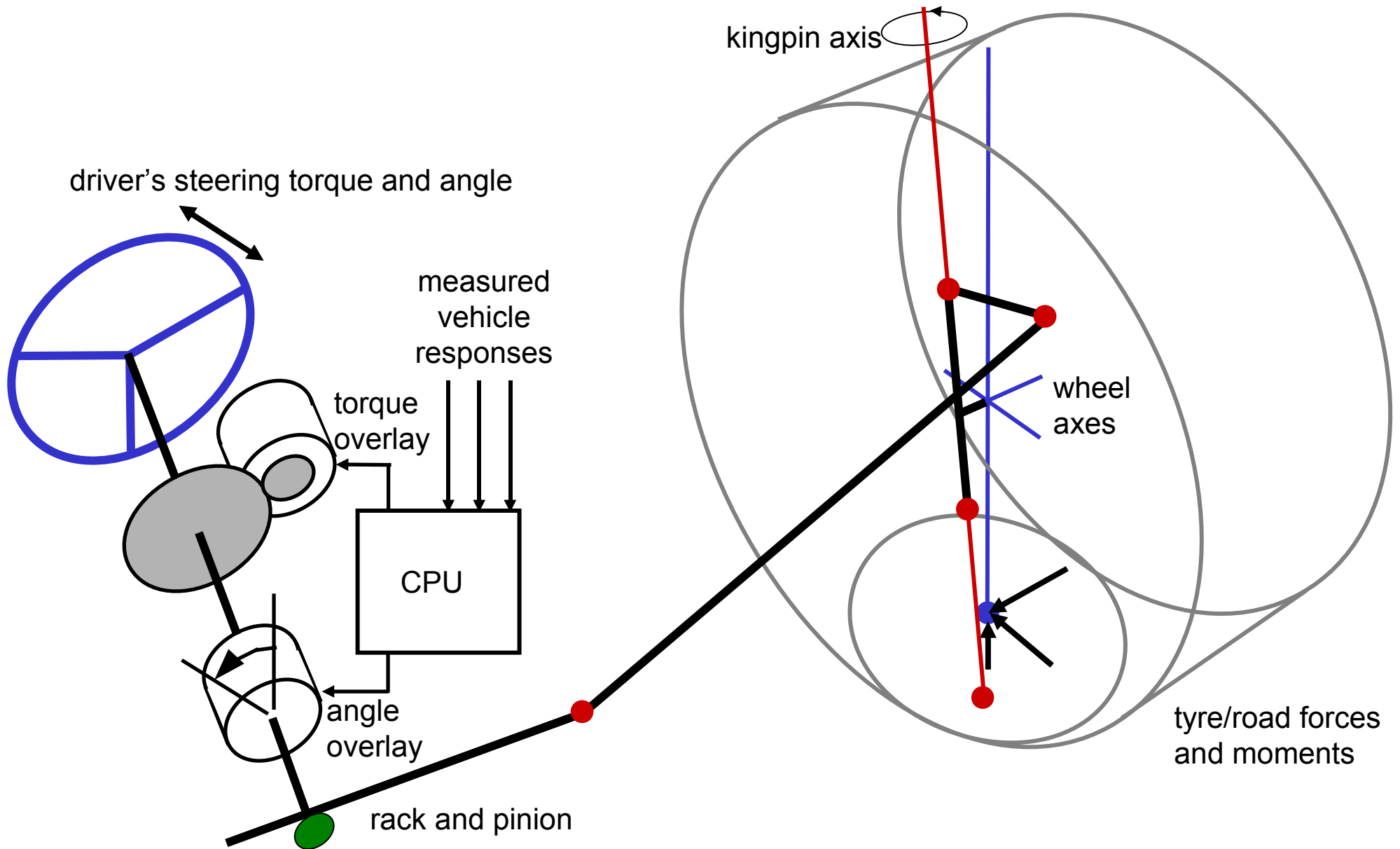
Steering feedback: modelling its effect on driver and vehicle

David Cole

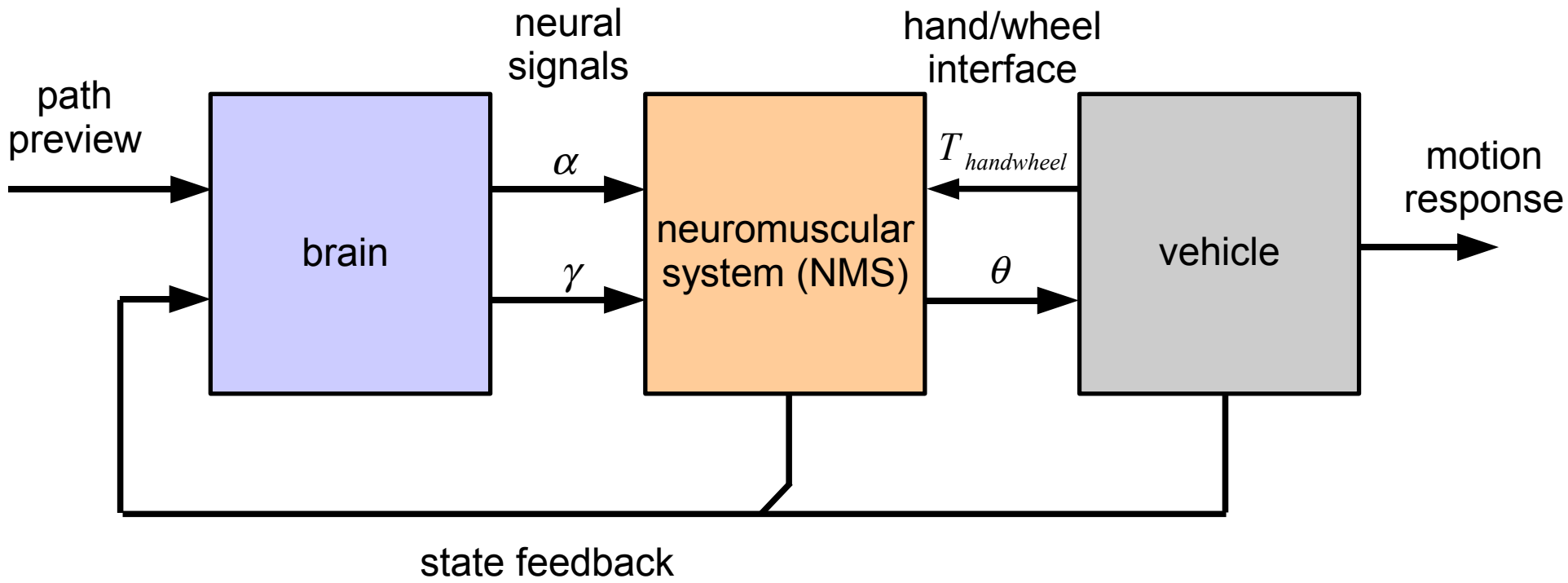
Driver-Vehicle Dynamics Group

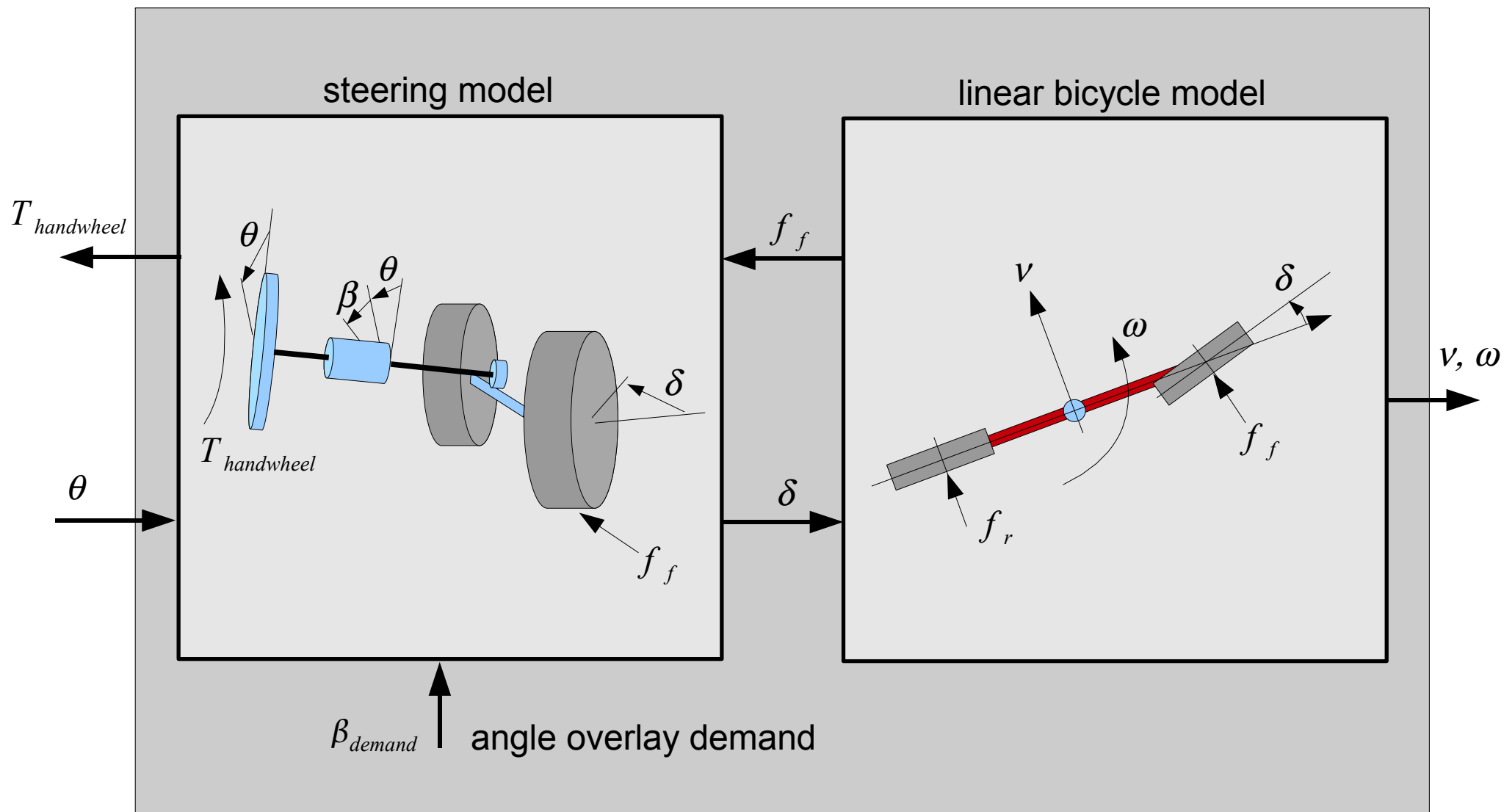
Cambridge University Engineering Department

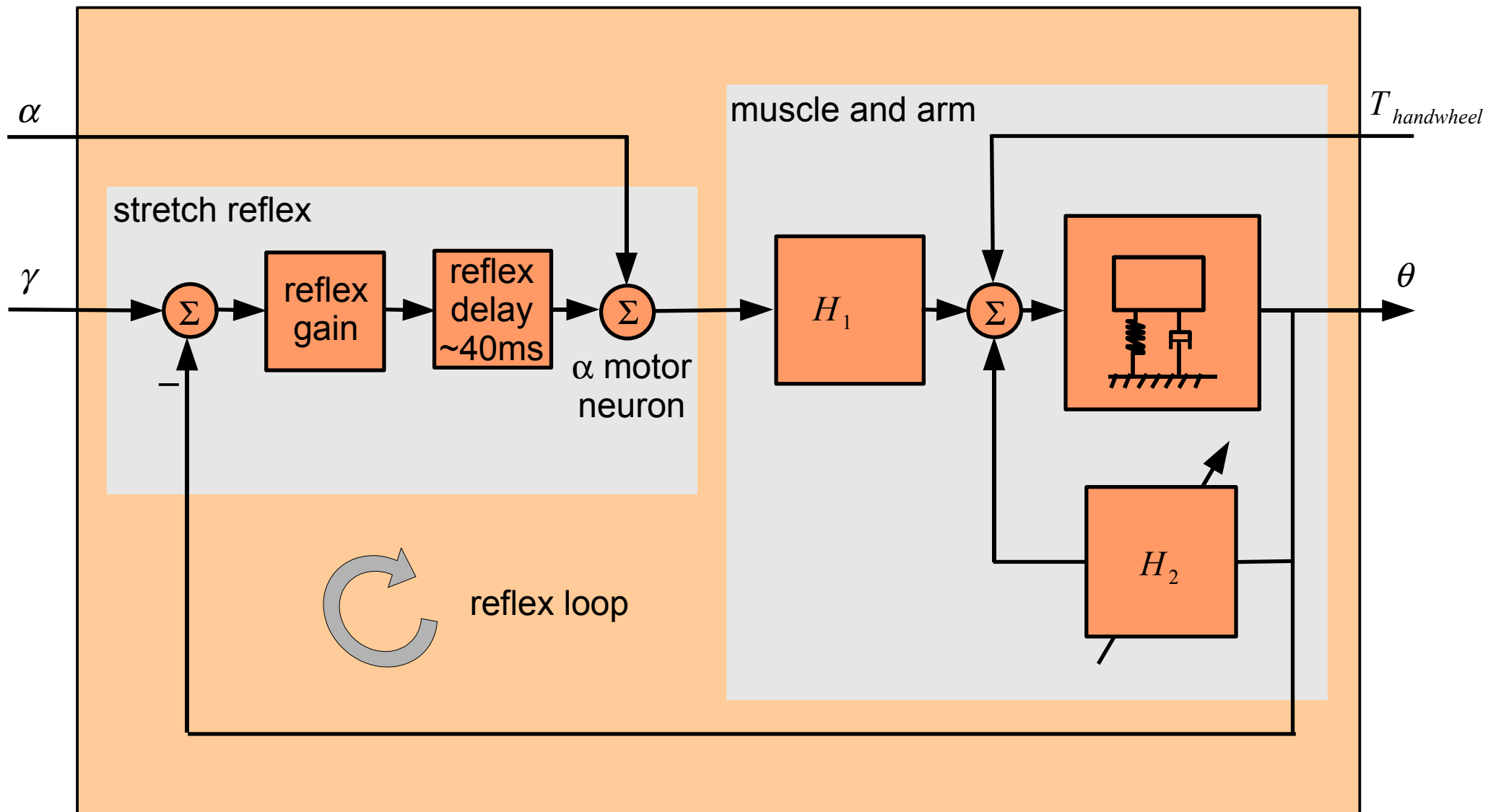
www.vehicledynamics.org





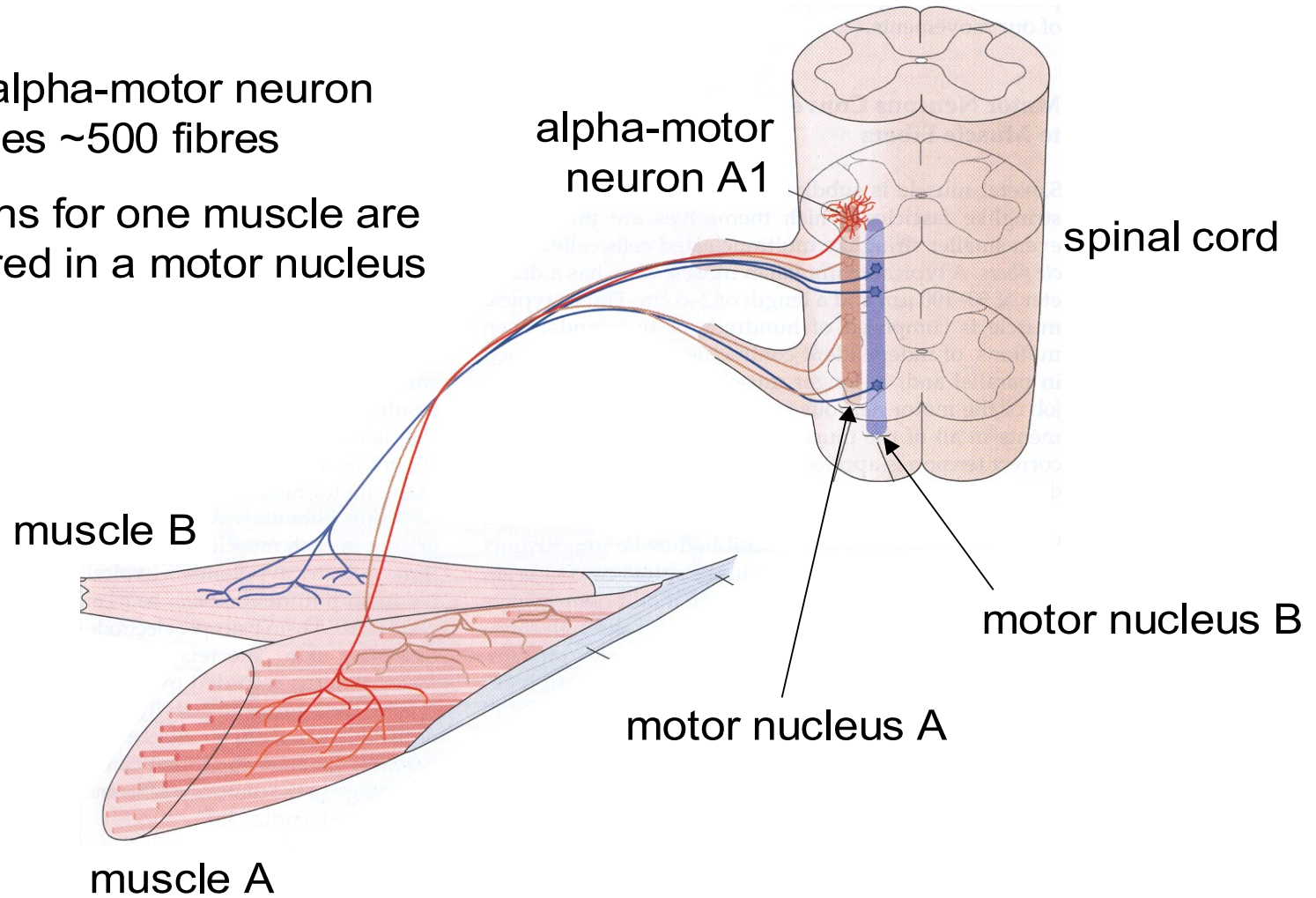


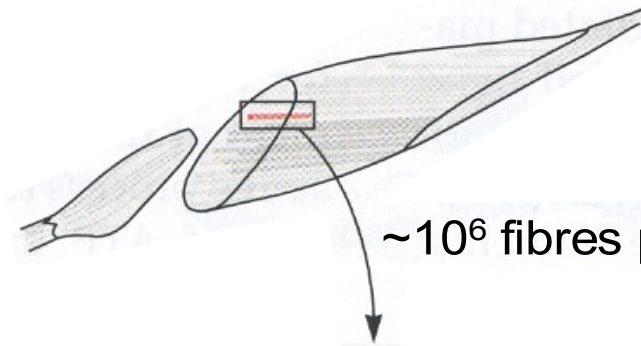






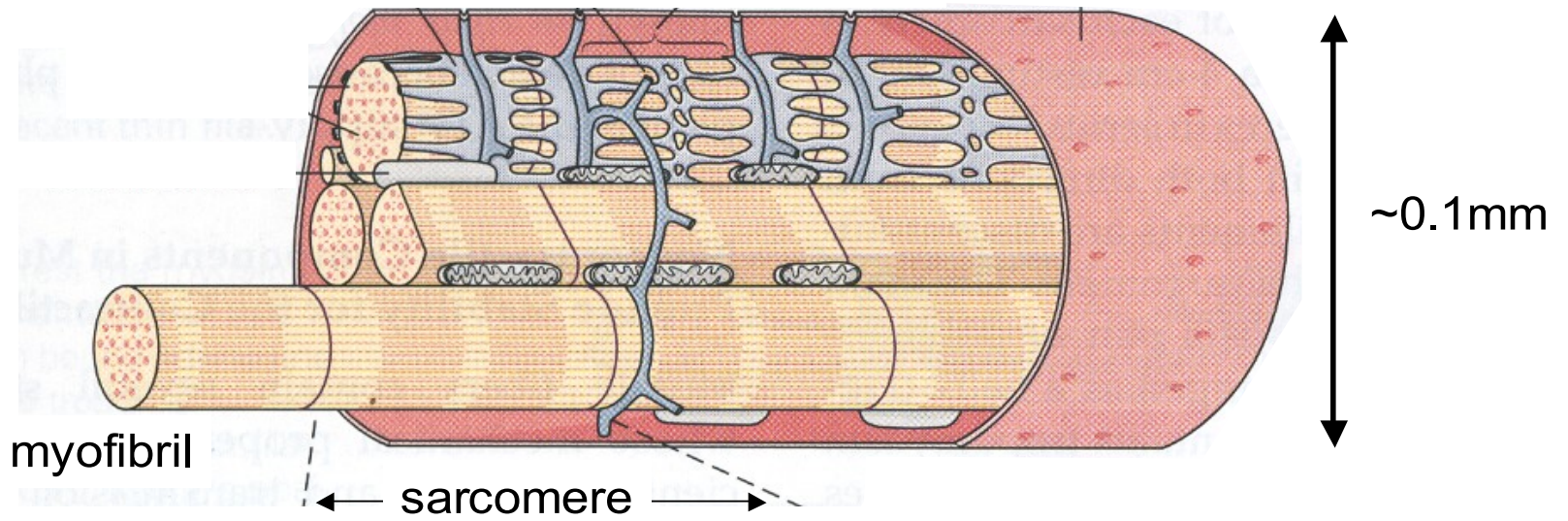
- Each alpha-motor neuron activates ~500 fibres
- Neurons for one muscle are clustered in a motor nucleus





$\sim 10^6$ fibres per muscle

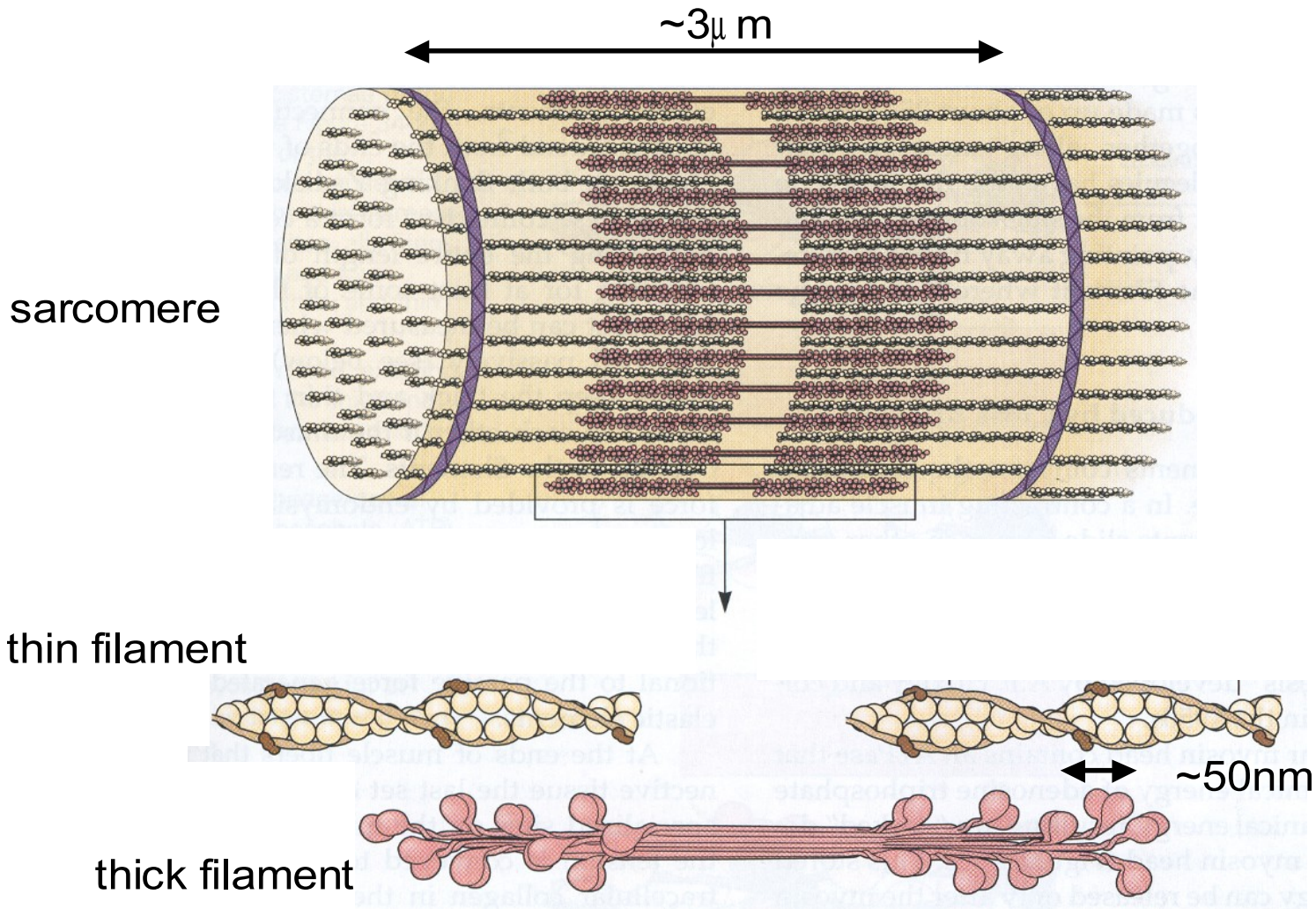
$\sim 50\text{mm}$

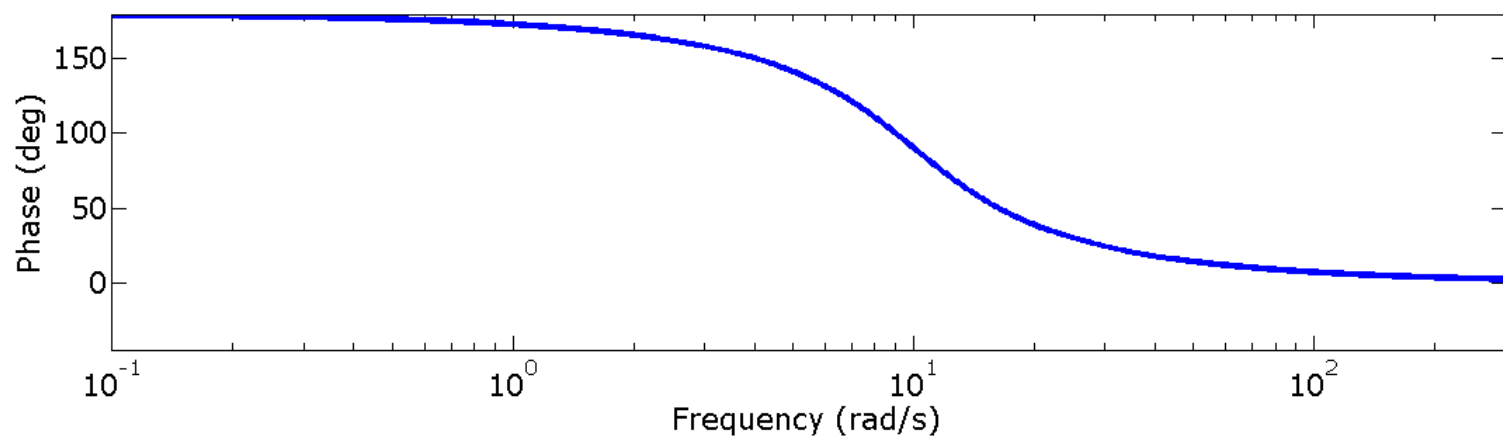
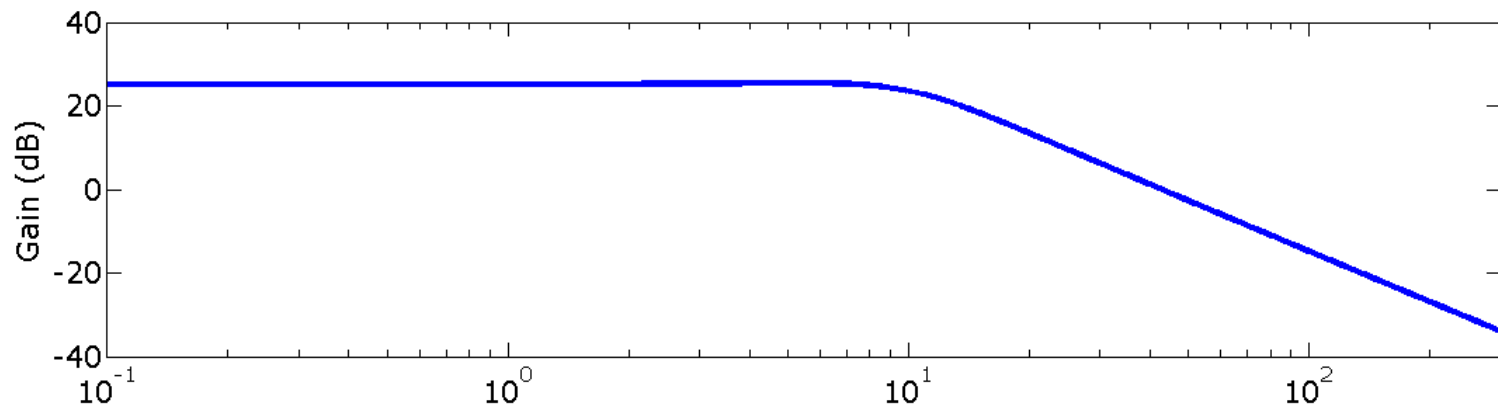
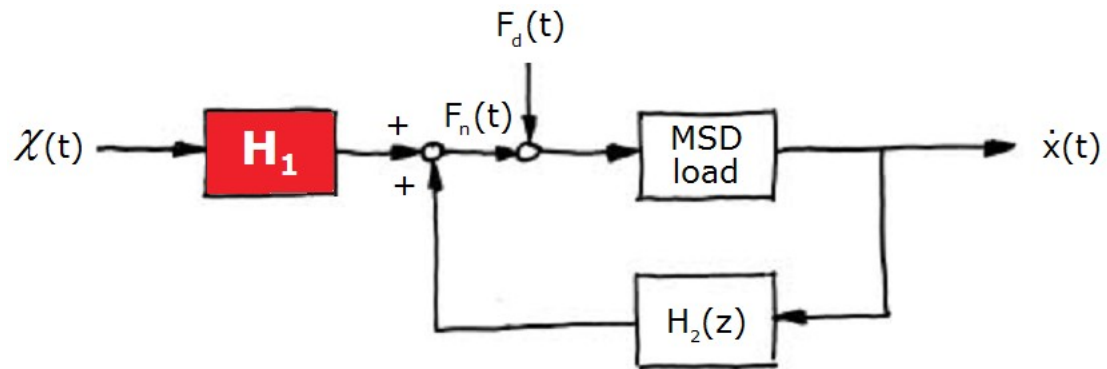


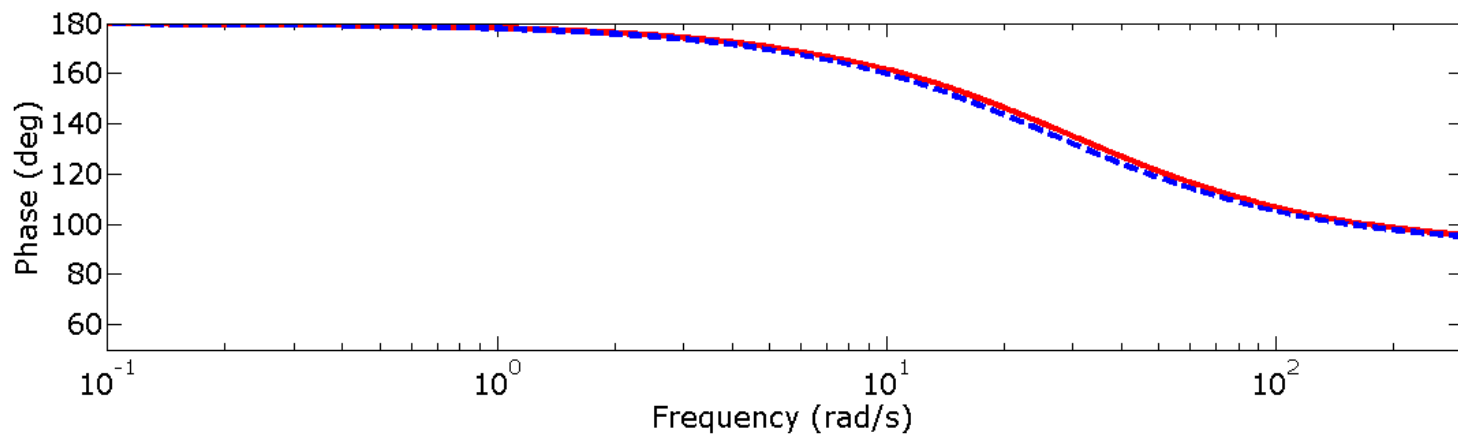
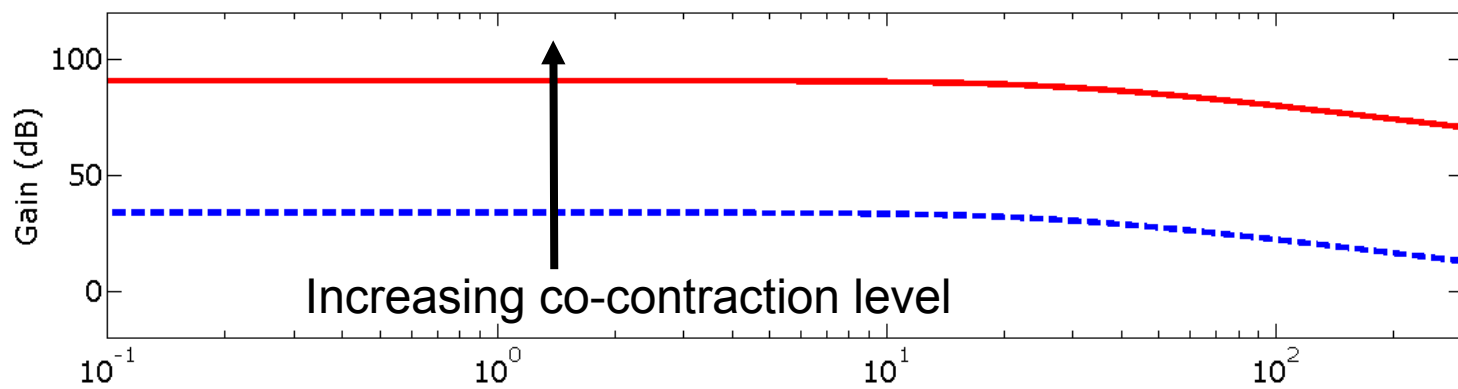
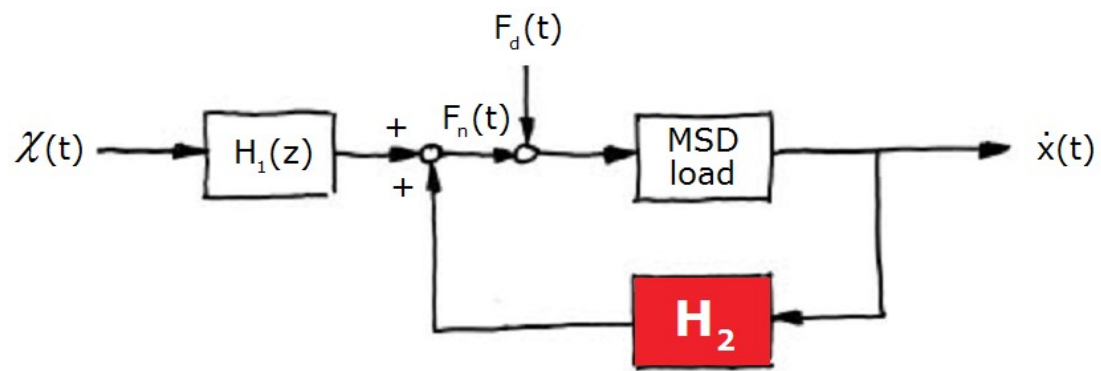
myofibril

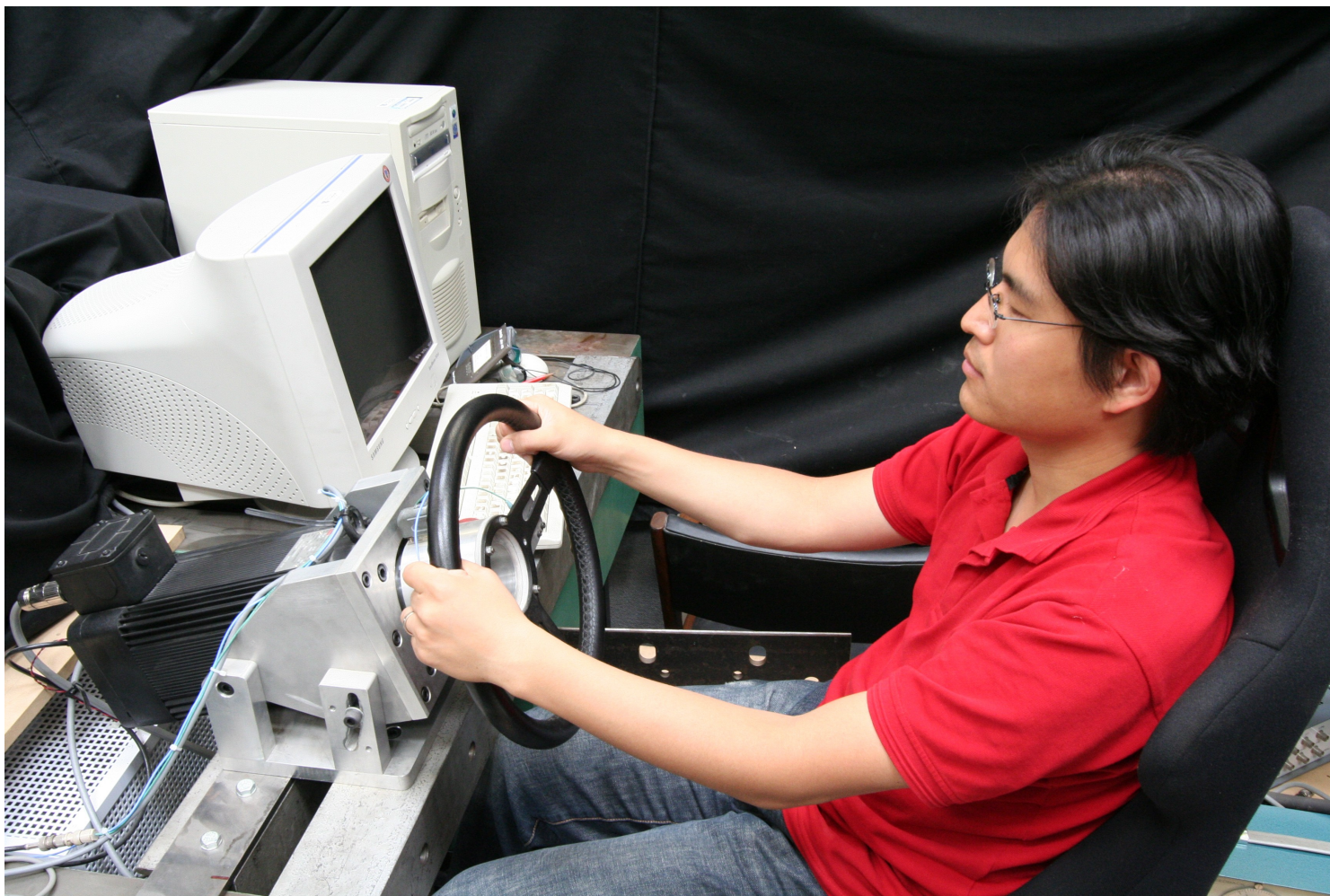
sarcomere

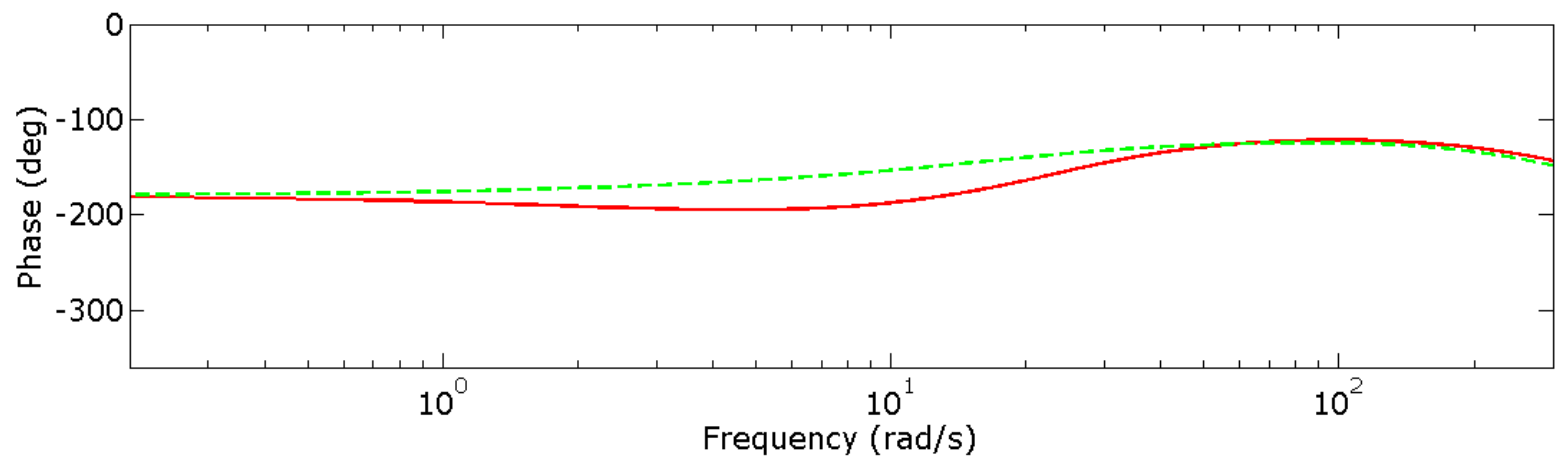
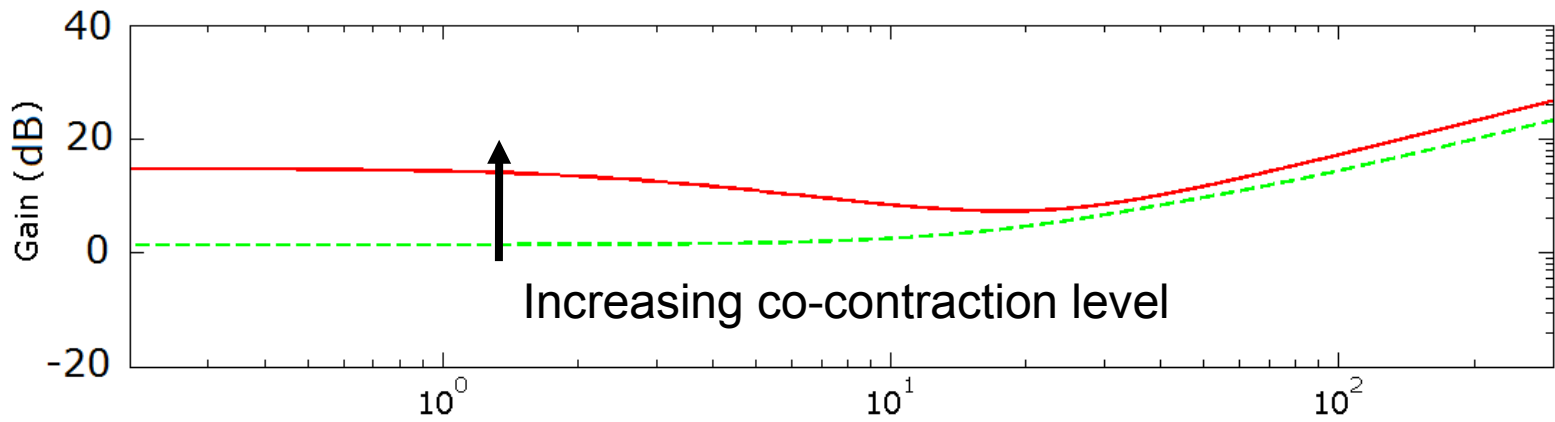
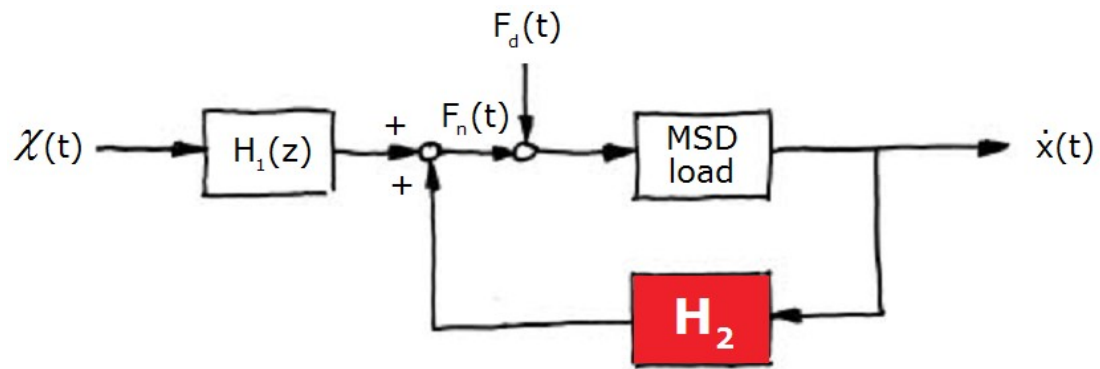
$\sim 0.1\text{mm}$

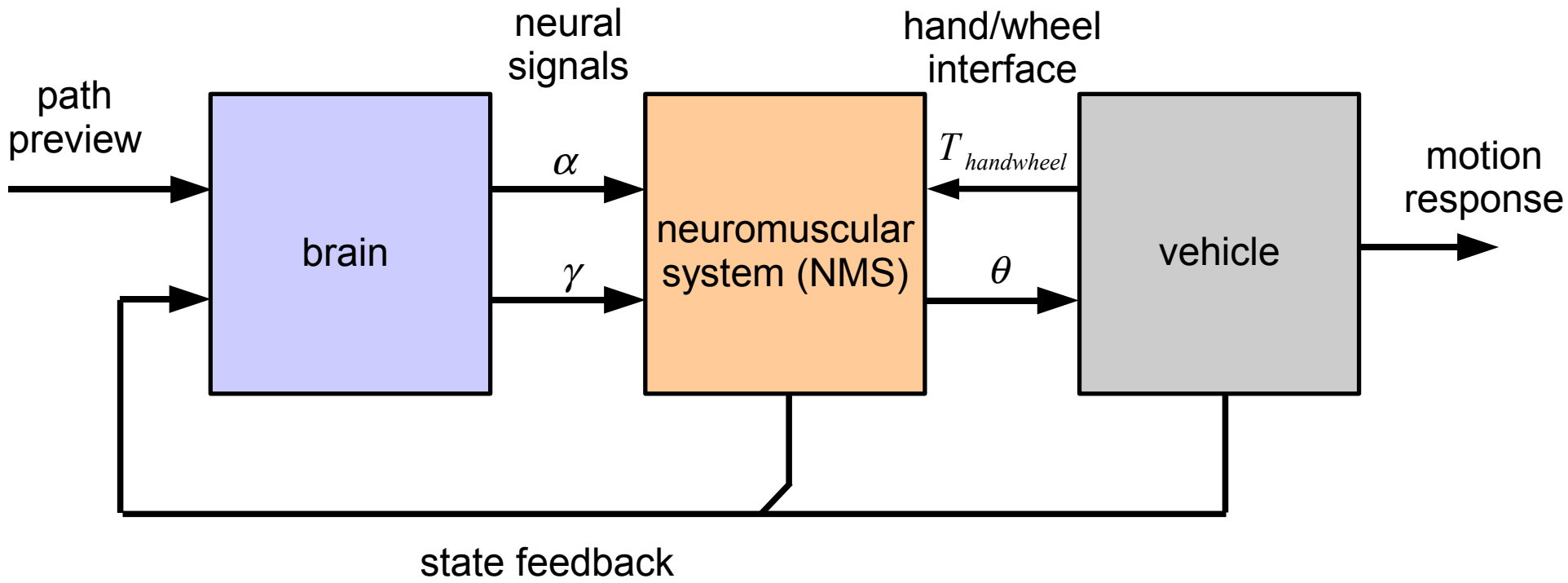


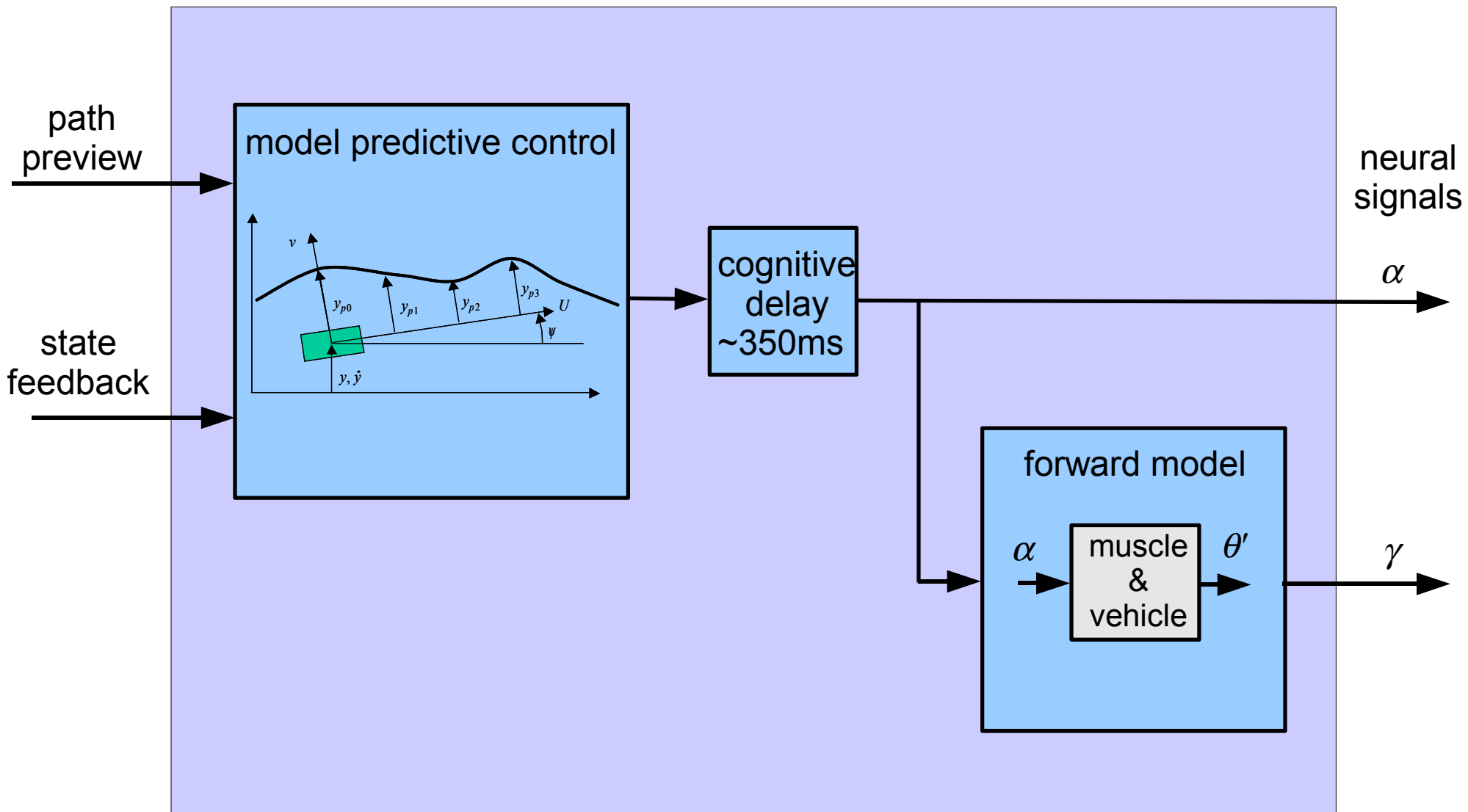


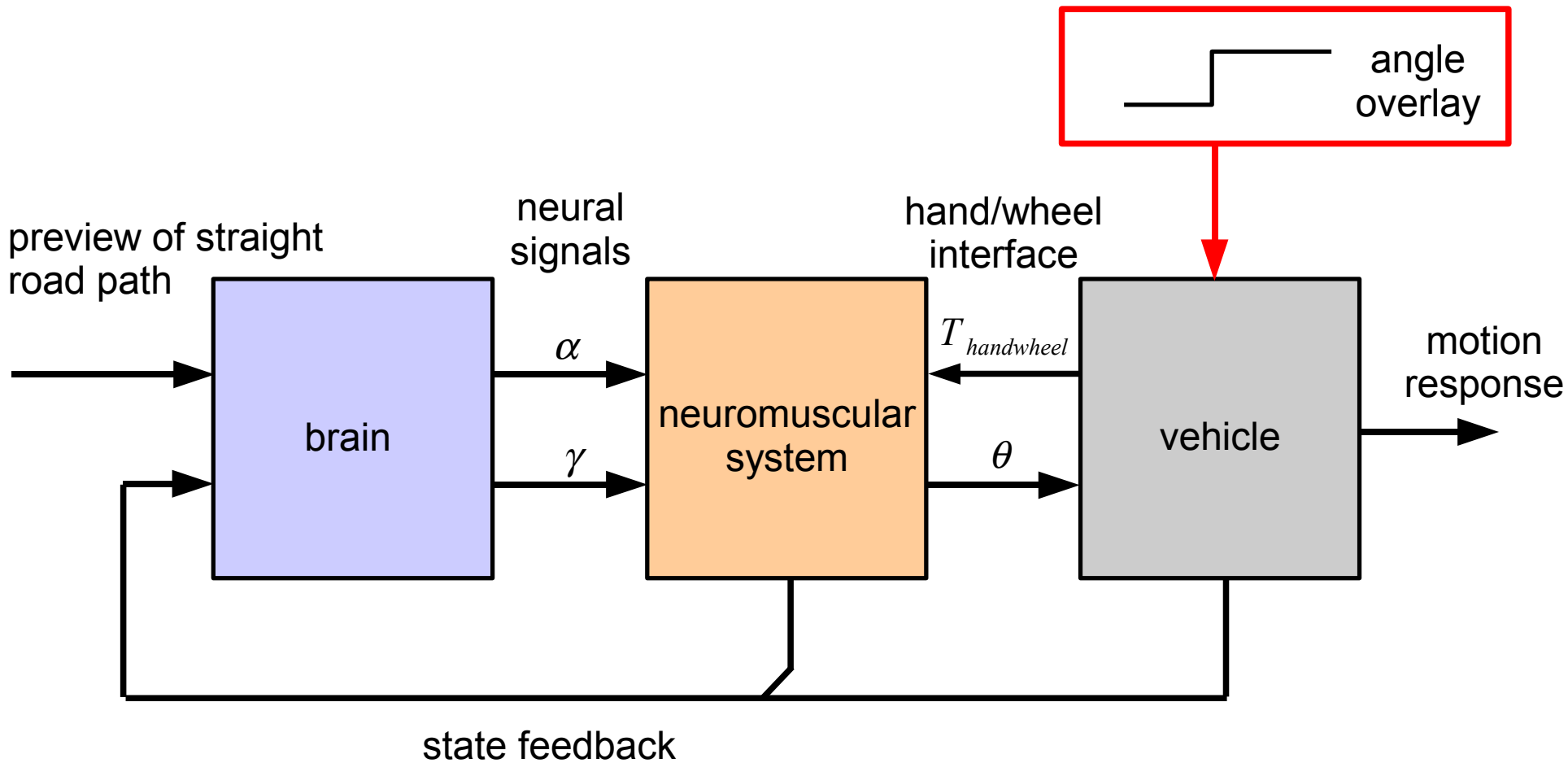




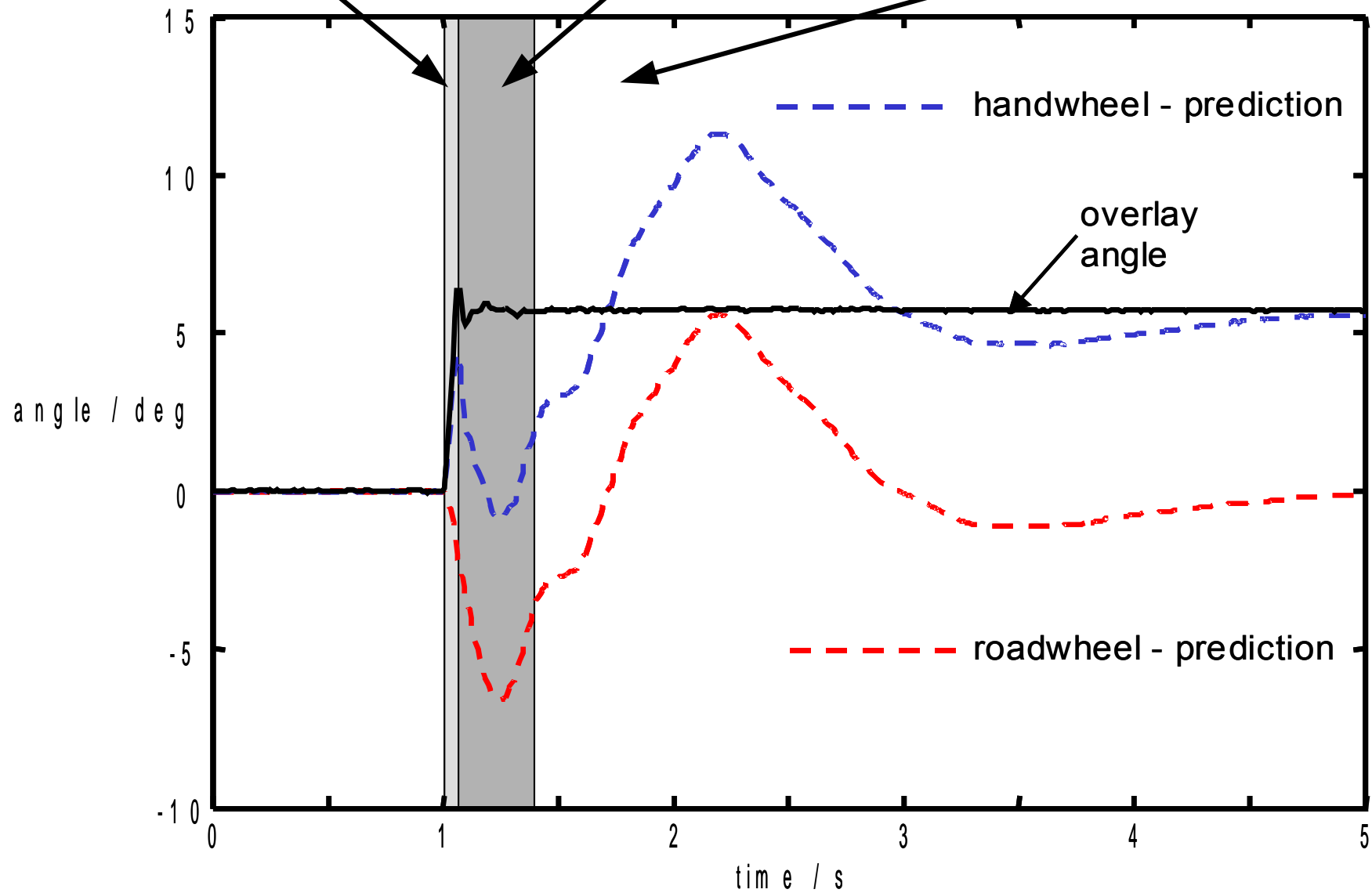




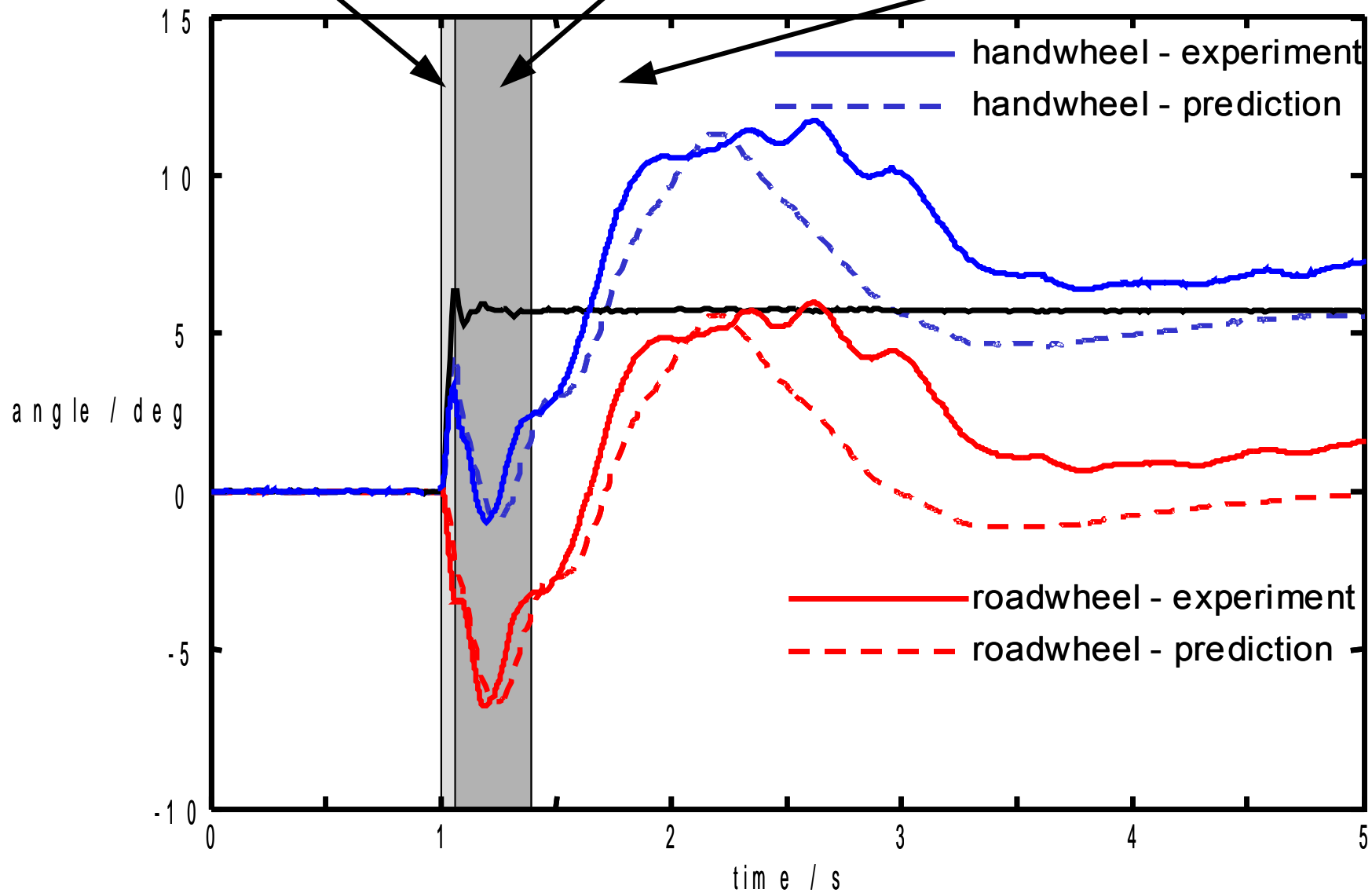




passive (from 0 ms); reflex (from 35ms); cognitive (from 350ms)



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Conclusions

- Aim is to shift engineering activity from prototype phase to design phase.
- Physiologically-based muscle model has been linearised.
- Neuromuscular properties have been identified experimentally.
- Driver-vehicle model with NMS predicts major features of measured response.
- Work is ongoing to measure driver properties and develop the driver model.

See www.vehicledynamics.org for further information.