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A tool for the automatic identification of weave and wobble

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Objective

The aim of the tool is the automatic identification of the frequency and damping of the weave and wobble vibration modes [1,2]. Starting from the logged signals (speed and yaw/steer rate required, GPS and accelerations optional), the tool automatically identifies coast down sections, constant speed sections, corner sections as well as the impulses applied by the rider. The resulting segments are fitted either by least squares optimization (LSF) of a damped sinusoidal or by stochastic subspace identification methods (SSI) [3,4,5].

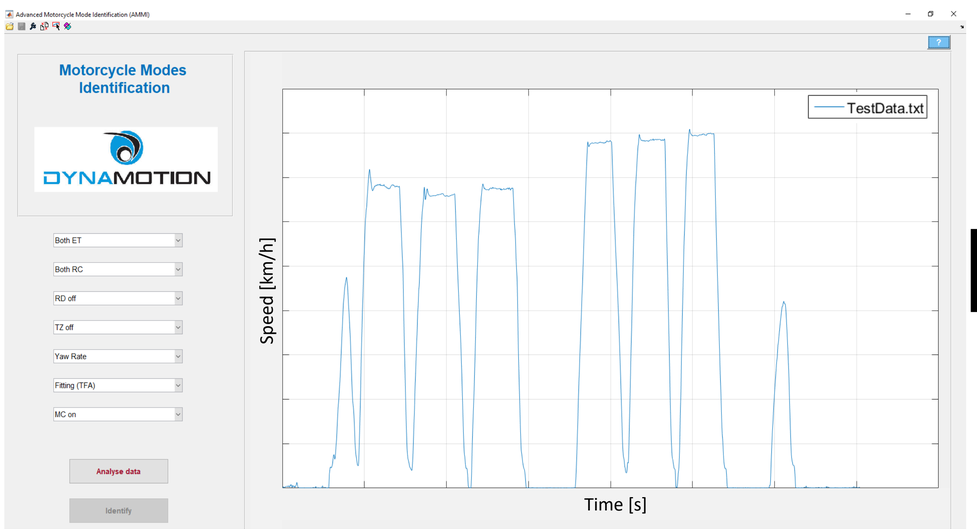

Fig. 1: main SW interface with imported speed signal shown

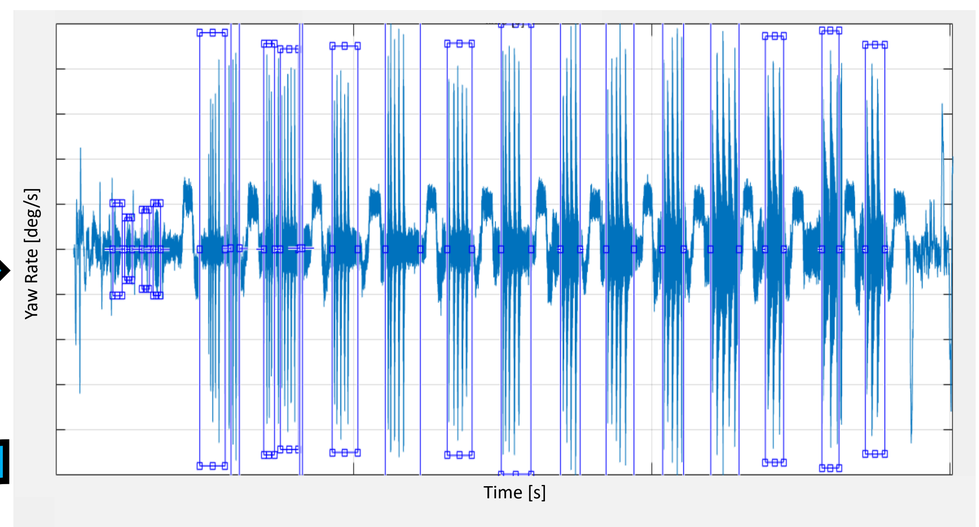

Fig. 2: automatic identification of constant speed sections and coast down sections

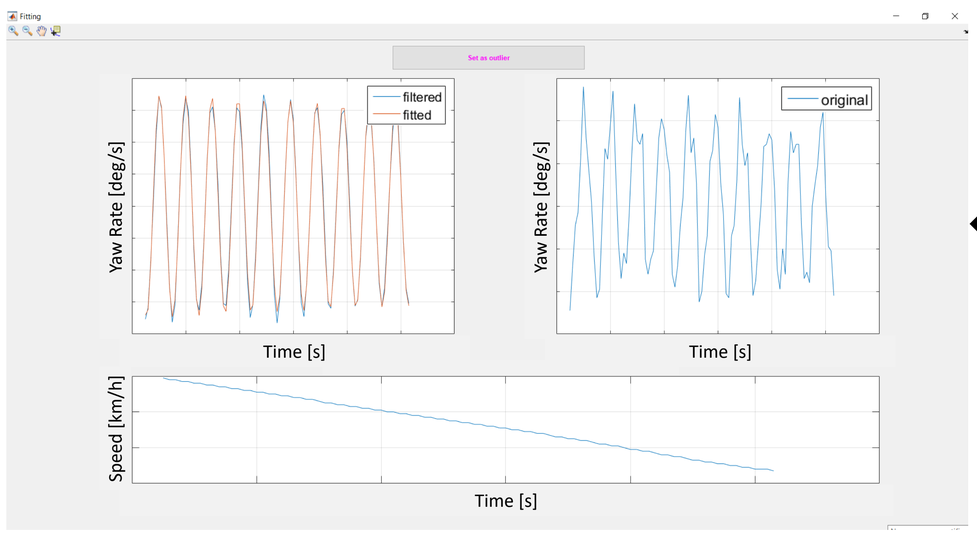

Fig. 4: sinusoidal fit results inspector (wobble example)

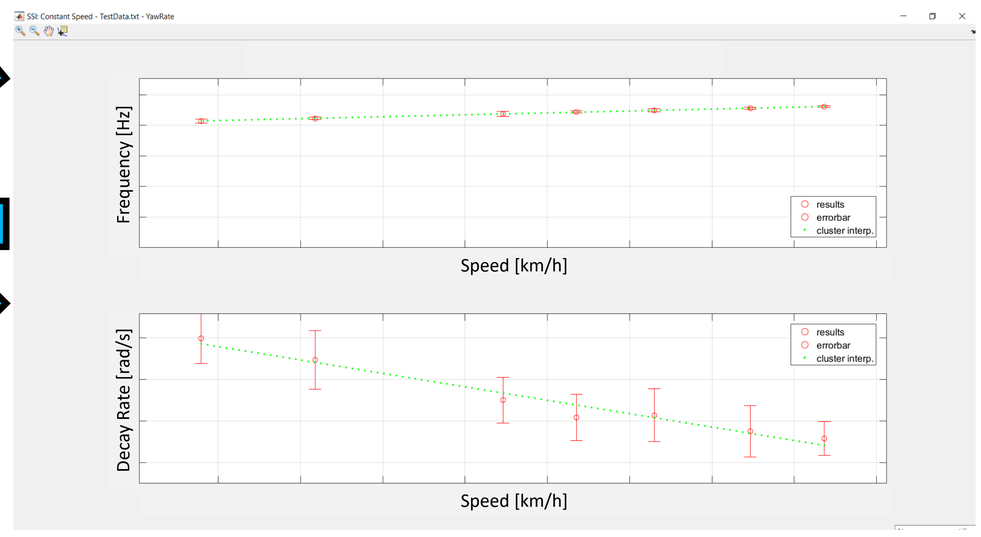

Fig. 3: identification results showing weave and wobble frequencies and decay rates as a function of speed

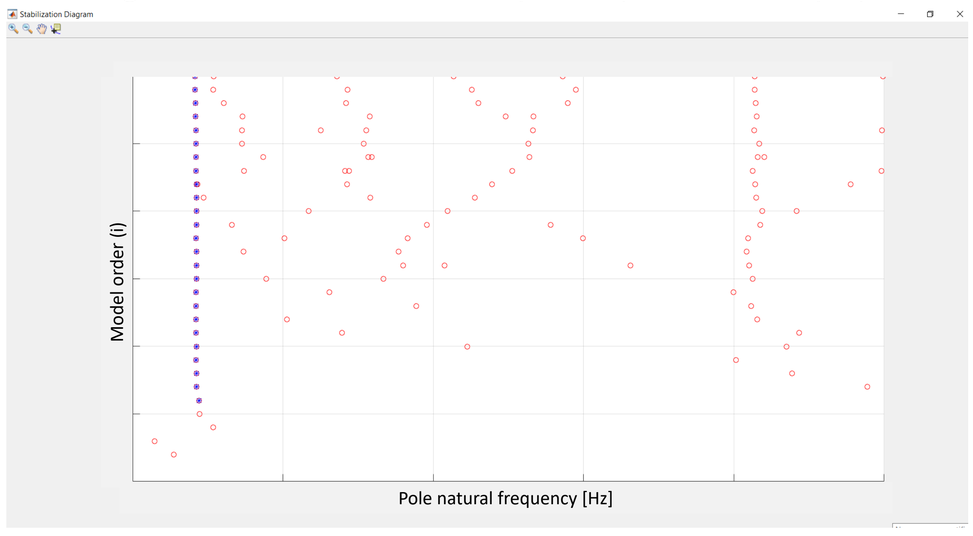

Fig. 5: stochastic subspace fit results inspector (weave example)

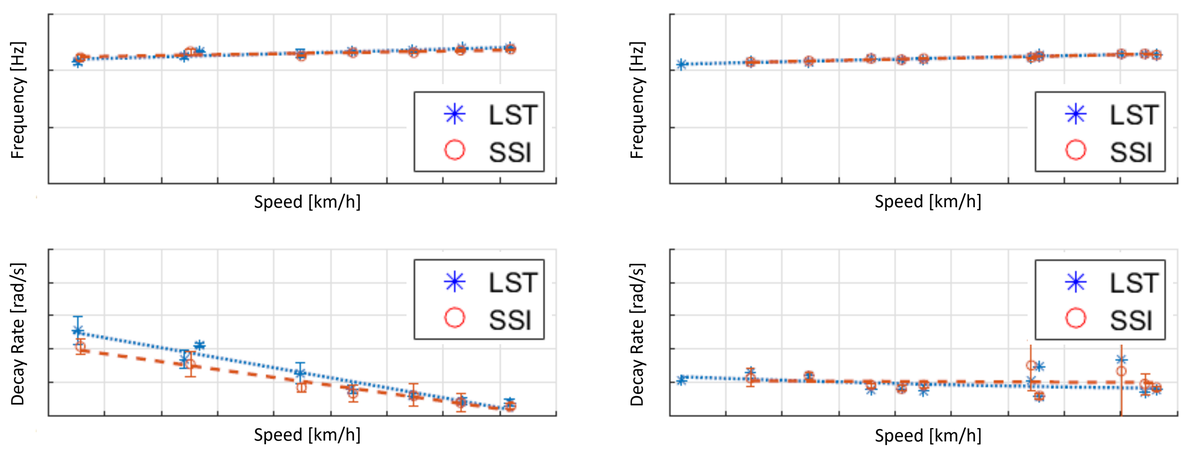

Fig. 4: comparison of LST vs SSI identification for weave (left) and wobble (right)

References

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