Abstract Submitted
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Estimation of the neural drive to the muscle from surface electromyograms[1] DAVID HOFMANN, Emory Univ — Muscle force is highly correlated with the standard deviation of the surface electromyogram (sEMG) produced by the active muscle. Correctly estimating this quantity of non-stationary sEMG and understanding its relation to neural drive and muscle force is of paramount importance. The single constituents of the sEMG are called motor unit action potentials whose biphasic amplitude can interfere (named amplitude cancellation), potentially affecting the standard deviation (Keenan etal. 2005). However, when certain conditions are met the Campbell-Hardy theorem suggests that amplitude cancellation does not affect the standard deviation. By simulation of the sEMG, we verify the applicability of this theorem to myoelectric signals and investigate deviations from its conditions to obtain a more realistic setting. We find no difference in estimated standard deviation with and without interference, standing in stark contrast to previous results (Keenan etal. 2008, Farina etal. 2010). Furthermore, since the theorem provides us with the functional relationship between standard deviation and neural drive we conclude that complex methods based on high density electrode arrays and blind source separation might not bear substantial advantages for neural drive estimation (Farina and Holobar 2016).

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David Hofmann
Emory Univ

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