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Integration of gravity during the motor planning and control of human movements

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ABSTRACT OF THE TALK

How humans plan and control their movements is still an open problem. The nervous system has to deal with the many forces that apply to the limbs. In particular, gravitational and inertial forces must be integrated at some step of the motor command elaboration in order to perform precise movements.

Assuming that human movements are optimal in a certain sense, a recurrent question in neuroscience is to determine if gravity and inertia are both taken into account during the optimization process in the higher centers of the brain or if gravity is simply compensated by lower level centers. More generally, we want to know which motor principles drive human movements. A modelling approach will be presented, arguing in favor of a subtle and inseparable processing of gravitational and inertial forces within the minimization of energy expenditure, at least during fast open-loop arm movements.