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Fractional-Order Information in the Visual Control of Locomotor Interception

Reinoud Bootsma[1], Remy Casanova[1] and Frank Zaal[2]

[1]Institute for Movement Sciences, Aix-Marseille University, France

[2]Center for Human Movement Sciences, University of Groningen, the Netherlands

Work on locomotor interception – contacting a moving target by means of whole-body displacement – has converged onto a limited set of strategies. During pursuit, the agent continuously moves in the current direction of the target (nulling angular eccentricity), while interception is accomplished by keeping the target's bearing constant (nulling angular velocity). For catching fly balls, a strategy of nulling angular acceleration has been proposed. Available information is thus generally conceived as (and limited to) integer-order time derivatives (pos=0, vel=1, acc=2). In this contribution, we will present experimental work demonstrating that observed behaviour indicates situation-dependent reliance on information of intermediate order, requiring combinations of Orders 0 and 1 for straight and Orders 1 and 2 for curving target trajectories. We argue that such (mostly unprincipled) combinations might advantageously be replaced with a fractional-order conception of information.

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