

# Chaos may facilitate decision making in the brain

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Although there are ample evidences for deterministic chaos in neuronal activity in vitro, few in vivo studies have reported the existence of chaos in the brain. Assuming that it exists, its functional role is still unclear. In this presentation, we examine whether three regions of the brain are of deterministic chaos or not while a monkey performs an arm reaching task. For the analysis, we used the distance between spike trains two of us recently proposed (Hirata and Aihara, *J. Neurosci. Methods* (2009)) and examined whether two similar spike trains diverge or not, as the time elapses since the cue onset. We found that, in some regions of behaving monkeys, the initially similar spike trains diverged immediately after the onset of cues. Therefore, deterministic chaos may play an important role in decision making in the brain.