Abstract Submitted
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Biofluiddynamics of balistiform and gymnotiform locomotion: Revisited[1] BRENNAN SPRINKLE, Engineering Sciences and Applied Mathematics, Northwestern University, RAHUL BALE, AMNEET SINGH, NELSON CHEN, Department of Mechanical Engineering, Northwestern University, MALCOM MACIVER, Department of Mechanical Engineering; Department of Neurobiology; Department of Biomedical Engineering, Northwestern University , NEELESH PATANKAR, Department of Mechanical Engineering; Engineering Sciences and Applied Mathematics, Northwestern University — Gymnotiform and balistiform swimmers are those which have an undulatory fin affixed to a rigid body unlike anguilliforms who undulate their entire body. Is there a mechanical advantage to gymnotiform and balistiform swimming? This question was investigated by Lighthill & Blake in a four paper series *Biofluiddynamics of balistiform and gymnotiform locomotion*. We revisit this work using fully resolved numerical simulations of the types of swimmers considered by Lighthill & Blake to interrogate the issue of mechanical advantage for rigid body swimmers. In doing so, we find that while there is advantage to rigid body swimming, the mechanism of 'momentum enhancement,' proposed by Lighthill and Blake, is not the cause. Further, we use our results and simulations to explain why some gymnotiform and balistiform swimmers have their propulsor attached to their bodies at an angle.

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