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Yaw Turning Experiments of a Bio-Inspired Vessel with Undulating Fin Propulsion[1] MOHAMMAD I UDDIN, GONZALO A. GARCIA, OSCAR M. CURET, Florida Atlantic University — Navigation of autonomous underwater vehicles (AUVs) in tight spaces, coastal zones and close to submerge structures remains a challenge. One of the problems preventing AUVs to navigate in these complex environments is an adequate propulsion system that allows the vessel to move in multiple directions and/or perform precise station-keeping. We present an underwater vehicle equipped with a bio-inspired fin propulsion. The propulsion system is a single flexible undulating fin that runs along the length of the robot which control forward and directional maneuvers. We establish a dynamic and control model relating different fin kinematics to performance in yaw turning maneuvers. Turning performance were tested during free-swimming experiments and compared with a numerical model. In particular, fin kinematics for two turning characteristic were considered: heading change or correction and minimum radius turns. In addition, the flow generated by the fin for turning kinematics were measured using particle image velocimetry. These experiments will be useful to establish optimal combination of the yaw turning parameters of undulating fin propulsion.

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