I. Nesteruk [1], J. H. E. Cartwright [2] , G. Passoni [3], A. Redaelli [4]

# Swimming efficiency estimations for animals

[1] *Institute of Hydromechanics, NASU, Kyiv, Ukraine,*
[2] *Instituto Andaluz de Ciencias de la Tierra, CSIC-Universidad de Granada, Spain,*
[3,4] *Politecnico di Milano, Italy*

[1]inesteruk@yahoo.com, [2]julyan.cartwright@csic.es,
[3]giuseppe.passoni@polimi.it, [4]alberto.redaelli@polimi.it

We show that the best swimmers have a streamlined shape that ensures an attached flow pattern and a laminar boundary layer at rather large values of the Reynolds number. We obtain simple expressions for the volumetric drag coefficient for an ideal laminar unseparated body of revolution and for a capacity-efficiency factor together with estimations of a critical value of the Reynolds number. The capacity-efficiency factor, calculated for different organisms and underwater vehicles, demonstrates that information about animal shapes and locomotion, as well as being of biological interest, should be of great use to improve robot fish and underwater vehicles.