ENGLISH SUMMARY

A BOUNDARY CONDITION IN FLUID MECHANICS

Eero-Matti Salonen

A boundary condition in fluid mechanics for inlet boundaries consisting of a given flow direction and of a given total pressure is discussed and its physical content is described. An analogical boundary condition in solid mechanics is found to be a kind of elastic supported boundary with a given displacement. This result may help the practitioner of solid mechanics to accept the validity of the boundary condition. The possibility to use thought experiments in connection with boundary conditions is recommended.

THEORY OF OPTIMAL COMPETITIVE RUNNING

Matti A Ranta

The article presents a simple model for competitive running under the quadratic air resistance law and that for the human energy production. The model presented here takes the curvature of the running track into account. There are four parameters in the model. Two parameters for sprinting and two for distance running, the transition between them takes place at the critical distance and/or time. The approximate analytical formulae of this transition are also given. The optimal running speed strategy is due to Professor Keller. It tells that during the sprint distances the maximum propulsive force must be used. During the distance running the runner's energy supply should be empty just before finishing the running. The right timing is important. Thus there is a slow down phase instead of a spurt. The value of parameters are determined by the least square fit into the prevailing running world records of [10]. The model tells when the existing world record time is better or worse than the predicted one. The root mean square value of the calculated error is 0.827% while its deviation is 1.312%.