Thnx

**Active flow control insight gained from a modified integral bound-
ary layer equation** AVRAHAM SEIFERT, Tel Aviv Univ — Active Flow Control
(AFC) can alter the development of boundary layers with applications (e.g., reduc-
ing drag by separation delay or separating the boundary layers and enhancing vortex
shedding to increase drag). Historically, significant effects of steady AFC methods
were observed. Unsteady actuation is significantly more efficient than steady. Full-
scale AFC tests were conducted with varying levels of success. While clearly relevant
to industry, AFC implementation relies on expert knowledge with proven intuition
and or costly and lengthy computational efforts. This situation hinders the use of
AFC while simple, quick and reliable design method is absent. An updated form
of the unsteady integral boundary layer (UIBL) equations, that include AFC terms
(unsteady wall transpiration and body forces) can be used to assist in AFC analysis
and design. With these equations and given a family of suitable velocity profiles,
the momentum thickness can be calculated and matched with an outer, potential
flow solution in 2D and 3D manner to create an AFC design tool, parallel to proven
tools for airfoil design. Limiting cases of the UIBL equation can be used to analyze
candidate AFC concepts in terms of their capability to modify the boundary layers
development and system performance.

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