Limiting maximum drag reduction asymptote for the moment coefficient of an enclosed rotating disk with fine spiral grooves

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Abstrak

In this study, the limiting maximum drag reduction asymptote for the moment coefficient of an enclosed rotating disk
with fine spiral grooves in turbulent flow region were obtained analytically. Analysis which were based on an
assumption for a simple parabolic velocity distribution of turbulent pipe flow to represent relative tangential velocity,
was carried out using momentum integral equations of the boundary layer. For a certain K- parameter the moment
coefficient results agree well with experimental results for maximum drag reduction in an enclosed rotating disk with
fine spiral grooves and drag reduction ratio approximately was 15 %. Additionally, the experimental results for drag
reduction on a rotating disk can be explained well with the analytical results.