

## عنوان مقاله:

An Accurate Taylors Series Solution with High Radius of Convergence for the Blasius Function and Parameters of Asymptotic Variation

## محل انتشار:

دوماهنامه مکانیک سیالات کاربردی، دوره 7، شماره 4 (سال: 1393)

تعداد صفحات اصل مقاله: 8

## نویسندگان:

S. Anil Lal - Department of Mechanical Engineering, College of Engineering Trivandrum, Kerala, India

M. Neeraj Paul - Department of Mechanical Engineering, College of Engineering Trivandrum, Kerala, India

## خلاصه مقاله:

This paper reports a high accurate solution of the Blasius function  $f(h)$  in the form of a converging Taylor's series for a higher range of  $h \in [0;9]$ . The method used consists of conversion of the boundary value problem into an initial value problem and solution by differential transform method. The initial value of the second derivative of the Blasius function is determined from the final value of first derivative of another function. The final value of first derivative of the latter function is determined by the Taylor's series expansions with center at  $h = 15$ . The series expansion for the Blasius function is obtained with center of expansion at  $h = 4$ , is alternating and is accurately converging for higher values of  $h$ , with the number of used for summation equal to  $2000$ . The present expansion is obtained without resorting to approximations and has a higher radius of convergence. The first  $200$  coefficients of the series, the second derivative of the function at  $h = 0$ , the parameters of the asymptotic solution are reported with  $21$  decimal places accuracy. The level of accuracy of the results presented is higher than any other results reported so far. This note also reports the mathematical steps involved in the derivation of the similarity variable of Blasius problem.

## کلمات کلیدی:

Differential transform, Taylor's series, Similarity variable, Blasius function, Exact solution

## لینک ثابت مقاله در پایگاه سیویلیکا:

<https://civilica.com/doc/1385092>

