During the computations as a measure of convergence to the steady state, I monitored residual for stream function. The residual parameter, RES is normalized by the representative value at the previous time step. This then provides an indication of the maximum percent change in w and x in each iteration step. ………. is defined as

In our calculations, for all Reynolds numbers we considered that convergence was achieved when both RES1w 6 1010 and RES1x 6 1010 was achieved.

I have presented accurate numerical solutions of the 2-D steady incompressible backward-facing step flow obtained using the efficient numerical method. a convergence criteria that is close to machine accuracy, we were able to obtain numerical solutions up to very high Reynolds numbers. Also, the location of the exit boundary and the outflow boundary condition has an effect both on the accuracy and on the largest Reynolds number that could be computed numerically. My results also indicate that the size of the recirculating regions grows almost linearly as the Reynolds number increases.

Using the described numerical method and the boundary conditions, we obtained steady numerical solutions for up to Reynolds number of 1000 and above this Reynolds number our numerical solution was not converging, but it was oscillating. This fact suggested that as the outflow boundary was moved away from the step location, it was possible to obtain steady numerical solutions of the flow over a backward-facing step for higher Reynolds numbers.