LECTURE 7
TIME MEASUREMENT

In order to measure the wall-clock-time in seconds of work of a part of a program, we may apply the \textit{MPI} command

\begin{verbatim}
MPI_Wtime()
\end{verbatim}

with nothing between the parenthesis. Typical use of this \textit{MPI} command (in FORTRAN STANDARD) is as follows:

\textbf{START OF THE TIME MEASUREMENT}

\begin{verbatim}
TB = MPI_Wtime()
\end{verbatim}

\textbf{PROGRAM}

\textbf{END OF THE TIME MEASUREMENT}

\begin{verbatim}
TE = MPI_Wtime()
TT = TE - TB
TM = TT/lp
call MPI_Reduce(TM, MEDIUM, 1, MPI_Real8,
                MPI_SUM, 0, MPI_Comm_World, ierr)
if (s . eq . 0) then
  write(*,*)'MEDIUM TIME =', MEDIUM
  write(*,*)'PROCESSOR TIME =', TT, ' s =', s
else
  write(*,*)'PROCESSOR TIME =', TT, ' s =', s
endif
\end{verbatim}
Here:

- real*8 $TB, TE, TT, MEDIUM$
- integer $lp, s$
- $lp$ - number of all processors in use, $s$ - number of the processor in turn
- $TB, TE$ - Wall-clock -time in seconds respectively at the moment of start and at the moment of end of running of the PROGRAM in the processor Nr. $s$
- $TT$ - time of running the program in the processor Nr. $s$
- $MEDIUM$ - the wall-clock-time in seconds, arithmetic medium time respect to the number of all processors $lp$. $MEDIUM$ is sent to the processor of number 0.

**SPEEDUP - THE MEASURE OF SCALLING OF PROGRAMS**

$SPEEDUP = sp$

$sp = \frac{\text{time of running the program on one processor}}{\text{time of running the program on } n \text{ processors}}$

Ideal value of speedup is $sp = n$, but this almost never occurs. This is the case of the best possible scalling.