Parallel Computing – Assignment 1

The application I came across is **parallelizing an oil refining simulation**, the article in the *ScienceDirect*. The important process in oil refining is to separate the crude oil into various oil products which is called distillation. Parallelizing an oil refining simulation application actually computes the composition of the various oil products in these distillation columns. The parallelism in this application is examined at three levels: direct, structured, and asynchronous. This application uses Intel **iPSC/860** supercomputer which is ranked 495th in TOP500 as in 1995.

The triangular decomposition methods were applied to a refining simulation program on a **distributed memory** multicomputer. In this article it is shown that these methods are efficient. Also the experimental results demonstrate that asynchronous computing on the Intel iPSC/860 can improve the performance by overlapping communication and computations.

Current work involves applying the triangular decomposition method to solve large-scale sparse nonlinear systems, which are formed by the mathematical models for simulation, for different applications on different multiprocessor architectures.

Reference:

www.sciencedirect.com/science/article/pii/016781919400095R

The triangular decomposition methods can be understood from the following paper:
Triangular decomposition methods for solving reducible nonlinear systems of equations –
By J.E. Dennis Jr., J.M Martinez, X.Zhang