

CS 6363: Advanced Compiler Construction

Feb 24, 2010

You Name:

1. Order the following transformations when applying them to explore coarse-grained parallelism: loop distribution, loop fusion, loop parallelization, loop interchange, loop alignment.
2. How do we decide whether it is worthwhile to explore pipelined parallelism for a sequential loop?
3. Optimize the following loop nests for coarse-grained parallelism.

```
do 41 j=1,N
do 41 i=1,N
    duz(i,j,1) = c79dz*(u(i,j,2) - u(i,j,N))
1          + c136dz*(u(i,j,3) - u(i,j,N-1))
    duz(i,j,2) = c79dz*(u(i,j,3) - u(i,j,1))
1          + c136dz*(u(i,j,4) - u(i,j,N))
41 continue

do 40 j=1,N
do 40 i=1,N
    duz(i,j,N-1) = c79dz*(u(i,j,N) - u(i,j,N-2))
1          + c136dz*(u(i,j,1) - u(i,j,N-3))
    duz(i,j,N)   = c79dz*(u(i,j,1) - u(i,j,N-1))
1          + c136dz*(u(i,j,2) - u(i,j,N-2))
40 continue

do 50 k=3,N-2
do 50 j=1,N
do 50 i=1,N
    duz(i,j,k) = c79dz*(u(i,j,k+1) - u(i,j,k-1))
1          + c136dz*(u(i,j,k+2) - u(i,j,k-2))
50 continue
```