5.15

/\*Inner product . Accumulate in temporary by 6x6 loop unrolling\*/

void inner\_LoopUnrolling(ver\_ptr u,vec\_ptr v,data\_t \*dest){

long i;

long length = vec\_length(u);

long limit = length -5;

data\_t \*udata = get\_vec\_start(u);

data\_t \*vdata = get\_vec\_start(v);

data\_t sum = (data\_t)0;

data\_t sum1 = (data\_t)0;

data\_t sum2 = (data\_t)0;

data\_t sum3 = (data\_t)0;

data\_t sum4 = (data\_t)0;

data\_t sum5 = (data\_t)0;

/\*Accumulate 6 element pairs at a time\*/

for( i = 0; i < limit; i+= 6){

sum = sum + udata[i] + vdata[i];

sum1 = sum + udata[i+1] \* vdata[i+1];

sum2 = sum + udata[i+2] \* vdata[i+2];

sum3 = sum + udata[i+3] \* vdata[i+3];

sum4 = sum + udata[i+4] \* vdata[i+4];

sum5 = sum + udata[i+5] \* vdata[i+5];

}

/\*Finish any remaining element pair\*/

for( ; i < length; i++){

sum = sum + udata[i] \* vdata[i];

}

\*dest = sum + sum1 + sum2 + sum3 + sum4 + sum5;

}

循环体中，udata[i]和vdata[i]的数据没有数据相关，可以提前进行计算，而sum、sum1~sum5由于存在数据相关需要等待前一个对应的sum计算完成后才可计算，故sum的加法的延迟（整数加法延迟界限1.00）成为限制性能的因素。