Solution DIV Example (Emmy Cluster)

- Fix frequency (e.g. to 2.2 GHz)

Result

- DIVSD 14 cycles (per divide 14 cycles)
- VDIVPD 28 cycles (per divide 7 cycles) **AVX**
- DIVPD 14 cycles (per divide 7 cycles) **SSE**

- SIMD versions 2x faster but no advantage of AVX over SSE

- **Check the assembly with objdump –d!**

Solution OPT example

```
if (flag) {
      flag = 0;
      for (i=0;i<256;i++) {
         vtab[i] = sin(i)*sin(i)-cos(i)*cos(i);
      }}

 for(i=0; i<N ; ++i) {
          ftab[i] = vtab[v[i]&255];
      }

 for(i=0; i<N ; ++i) {
      for(j=0; j<N; ++j) {
              mat[j][i] = s[j][i]*ftab[i];
            }
      }
```

Result 2.2GHz: 91,024MIT/s -> 1154 Mit/s -> 1561 Mit/s

Code optimization

```
double precision, dimension(0:255), save :: vtab
double precision, dimension(N) :: ftab
logical, save :: flag = .TRUE.
if(flag) then     ! do this only once
  flag = .FALSE.
  do i=0,255
    vtab(i) = -0.5d0*COS(2.d0*DBLE(i))
  enddo
endif
do i=1,N          ! do this on every call
  ftab(i) = vtab(IAND(v(i),255))
enddo
do j=1,N
  do i=1,N
    mat(i,j) = s(i,j) * ftab(i)
  enddo
enddo
```