Simulation and Scientific Computing 2 Seminar

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Optimization techniques

- inline
- Successive Over-Relaxation (SOR)
- Red-Black Gauss-Seidel
- OpenMP
- Wall Clock Time / s = 0.695766

Red-Black Gauss-Seidel

```
for (int iter = 0; iter < times; iter++){
// red points
#pragma omp parallel for
for(int j=1;j<height-1;j++){
for(int i=1;i<width-1;i+=2){
 u(i,j)=(1-w)*u(i,j)+
     w*factor*(f(i,j)+
     h_2_inv*(u(i-1,j)+
     u(i+1,j)+u(i,j+1)+
     u(i,j-1)));}
 j++;
 if(j==height-1)continue;
 for(int i=2;i<width-2 i+=2){
  if(j==(height-1)*0.5
   && i>=(width-1)*0.5)continue;
   u(i,j)= ...;
}}
```

```
// black points
#pragma omp parallel for
for(int j=1;j<height-1;j++){
for(int i=2;i<width-2;i+=2){
u(i,j)=(1-w)*u(i,j)+
    w*factor*(f(i,j)+
    h_2_inv *( u(i-1,j)+
    u(i+1,j)+u(i,j+1)+
    u(i,j-1)));}
 j++;
 if(j==height-1)continue;
 for(int i=1;i<width-1;i+=2){
 if(j==(height-1)*0.5
 && i>=(width-1)*0.5)continue;
    u(i,j)=...;
}}}
```

Performance