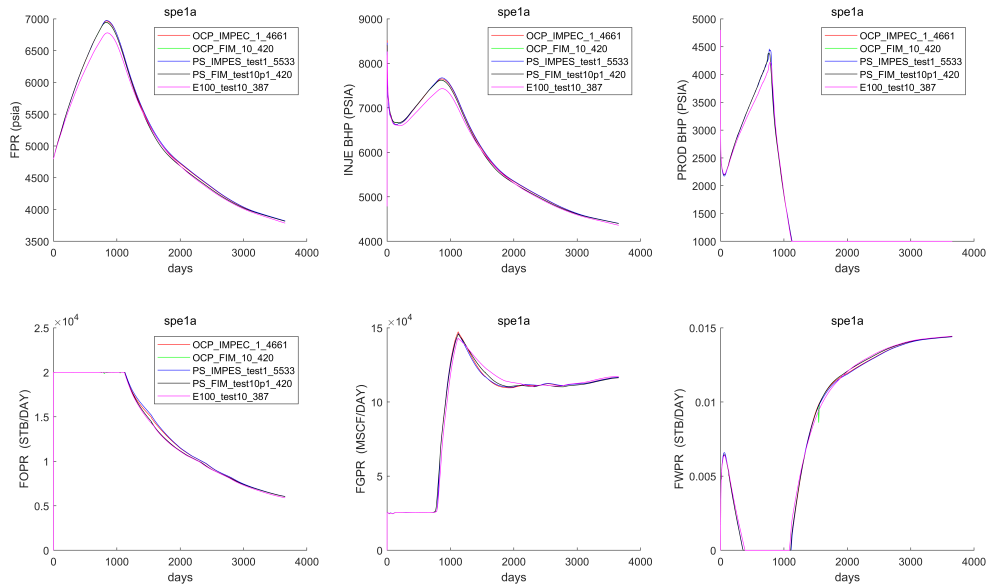


# SPE1A



## PS\_IMPEC\_1

Final time: 3655.5 Days  
Total time steps: 5533  
Total nonlin steps: 5533  
Total linear steps: 8828  
Linear solver time: 0.932773s  
Simulation time: 2.44659s

## OCP\_IMPEC\_1

Final time: 3655.500 Days  
Total time steps: 4661  
Total Newton steps: 4661  
Wasted Newton steps: 51  
Simulation time: 1.344s  
Total linear steps: 7884  
Linear solve time: 0.789s (58.670%)

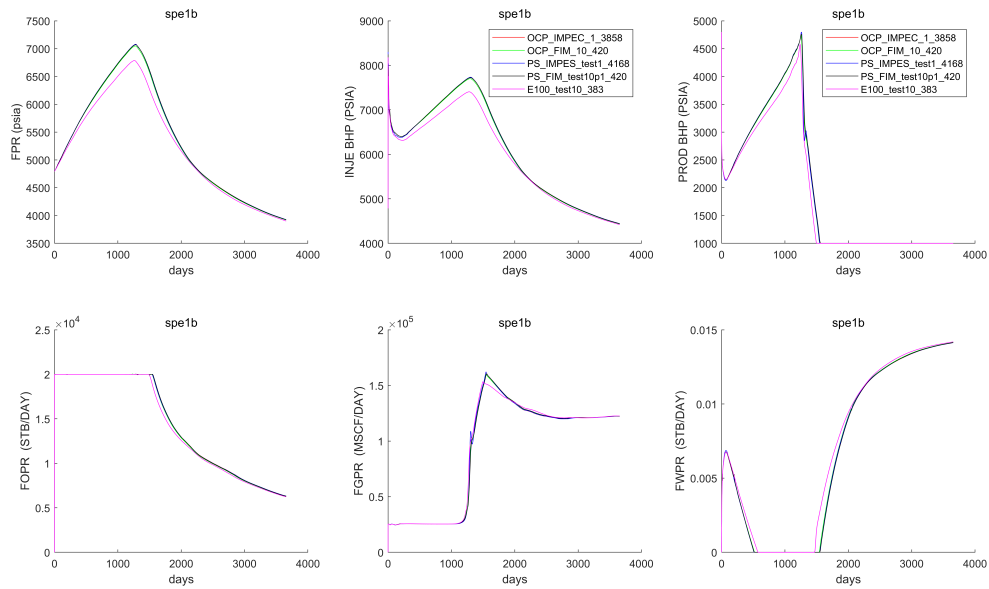
## PS\_FIM\_10

Final time: 3655.5 Days  
Total time steps: 420  
Total Newton steps: 434  
Wasted Newton steps: 1  
Total linear steps: 1235  
Linear solver time: 3.62965s  
Simulation time: 4.08421s

## OCP\_FIM\_10

Final time: 3655.500 Days  
Total time steps: 420  
Total Newton steps: 479  
wasted Newton steps: 1  
Simulation time: 5.362s  
Total linear steps: 1428  
Linear solve time: 5.058s (94.319%)

## SPE1B



## PS\_IMPEC\_1

Final time: 3655.5 Days  
Total time steps: 4168  
Total nonlin steps: 4168  
Total linear steps: 7601  
Linear solver time: 0.824397s  
Simulation time: 1.99241s

## OCP\_IMPEC\_1

Final time: 3655.500 Days  
Total time steps: 3858  
Total Newton steps: 3858  
wasted Newton steps: 19  
Simulation time: 1.140s  
Total linear steps: 7250  
Linear solve time: 0.683s (59.931%)

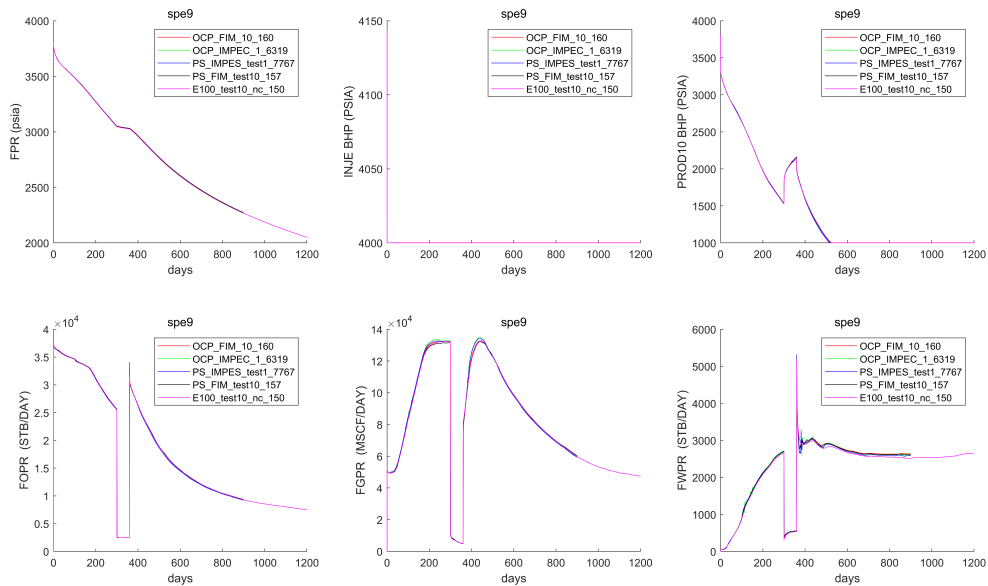
## PS\_FIM\_10

Final time: 3655.5 Days  
Total time steps: 420  
Total Newton steps: 437  
wasted Newton steps: 1  
Total linear steps: 1212  
Linear solver time: 2.6363s  
Simulation time: 3.08908s

## OCP\_FIM\_10

Final time: 3655.500 Days  
Total time steps: 420  
Total Newton steps: 507  
wasted Newton steps: 1  
Simulation time: 3.801s  
Total linear steps: 1507  
Linear solve time: 3.485s (91.696%)

## SPE9



## PS\_IMEPS\_1

Final time: 900 Days  
Total time steps: 7767  
Total nonlin steps: 7767  
Total linear steps: 12465  
Linear solver time: 57.9099s  
Simulation time: 276.62s

## OCP\_IMPES\_1

Final time: 900.000 Days

Total time steps: 6317  
Total Newton steps: 6317  
Wasted Newton steps: 42  
Simulation time: 79.238s  
Total linear steps: 8875  
Linear solve time: 49.847s (62.909%)

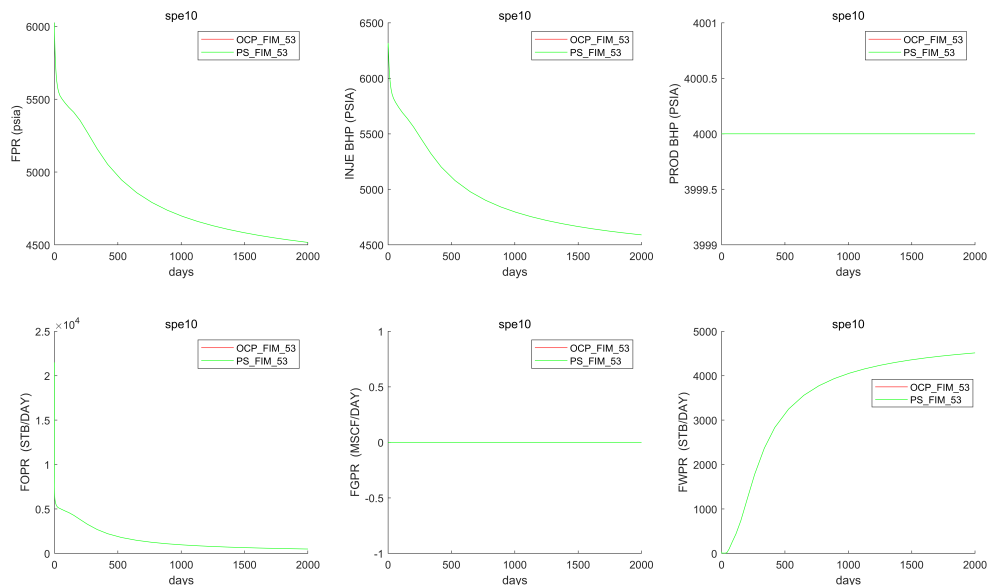
#### PS\_FIM\_10

Final time: 900 Days  
Total time steps: 157  
Total Newton steps: 216  
Wasted Newton steps: 53  
Total linear steps: 1061  
Linear solver time: 12.3944s  
Simulation time: 27.515s

#### OCP\_FIM\_10

Final time: 900.000 Days  
Total time steps: 160  
Total Newton steps: 222  
Wasted Newton steps: 63  
Simulation time: 19.938s  
Total linear steps: 1112  
Linear solve time: 13.269s (66.553%)

## SPE10



#### PS\_FIM

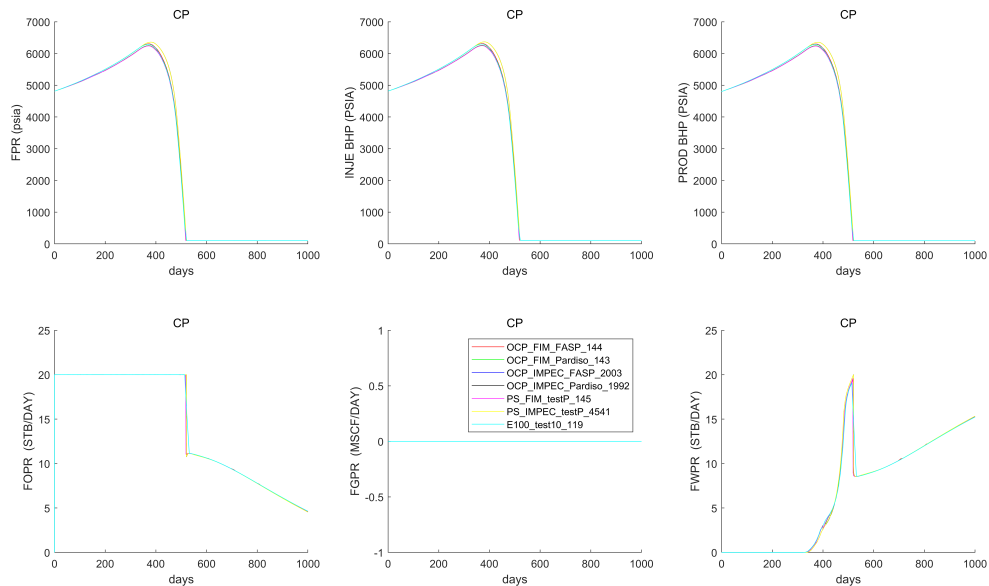
Final time: 2000 Days  
Total time steps: 53  
Total Newton steps: 215

wasted Newton steps: 5  
Total linear steps: 1305  
Linear solver time: 1413.86s  
simulation time: 2905.24s

OCP\_FIM

Final time: 2000.000 Days  
Total time steps: 53  
Total Newton steps: 217  
wasted Newton steps: 5  
Simulation time: 1937.163s  
Total linear steps: 1334  
Linear solve time: 1463.019s (75.524%)

## CP



网格规模较少，使用 **Pardiso** 直接法进行求解

PS\_IMPEC\_1

Final time: 1000.000 Days  
Total time steps: 4541  
Total nonlin steps: 4541  
Total linear steps: 4543  
Linear solver time: 2.269s  
simulation time: 28.627s

OCP\_IMPEC\_1

Final time: 1000.000 Days  
Total time steps: 1992  
Total Newton steps: 1992  
Wasted Newton steps: 3  
Simulation time: 0.509s  
Total linear steps: 1995  
Linear solve time: 0.441s (86.586%)

#### PS\_FIM\_10

Final time: 1000.000 Days  
Total time steps: 145  
Total Newton steps: 256  
Wasted Newton steps: 4  
Total linear steps: 263  
Linear solver time: 0.745s  
Simulation time: 1.654s

#### OCP\_FIM\_10

Final time: 1000.000 Days  
Total time steps: 143  
Total Newton steps: 261  
Wasted Newton steps: 11  
Simulation time: 0.441s  
Total linear steps: 272  
Linear solve time: 0.385s (87.120%)