

mlmc_transport

April 5, 2020

```
[2]: %matplotlib inline
import subprocess
import os
import sys
sys.path.append('../tools')
from plot_statistics import *
sys.path.append('../notebooks')
from tp_utilities import *
from vtk_utilities import *
import matplotlib.pyplot as plt
from starter import *
from mlmc_solution import *
sys.path.append('.')
from python.mlmc_mppy import mpp
```

```
[ ]: mpp.build()
      mpp.mute=True
      kernels = 32
```

\$ Konvergenz Test \$

```
[ ]: mpp.clean_data()
      mpp.run(kernels, config='mlmc_transport_ct')
      save("MLMCConvergenceTest/")
```

```
[ ]: mpp.print_convergence_table()
```

```
[ ]: mpp.show_convergence_table()
```

\$ MLMC Experiment epsilon = 0.01 \$

```
[ ]: mpp.clean_data()
      kwargs = {'epsilon': '0.01', 'initLevels': '4,5,6', 'initSampleAmount': '8,4,2'}
      mpp.run(kernels, config='mlmc_transport', kwargs=kwargs)
      save("MLMCExperiment/"+kwargs['epsilon']+"/")
```

```
[ ]: statistics = read_log('../results/MLMCExperiment/0.01/log')
      display(statistics)
```

```
[ ]: plot_statistics(statistics, ['E[Qf]', 'V[Qf]'], None)
```

\$ MLMC Experiment epsilon = 0.005 \$

```
[ ]: mpp.clean_data()
kwargs = {'epsilon': '0.005', 'initLevels': '4,5,6', 'initSampleAmount': '8,4,2'}
mpp.run(kernels, config='mlmc_transport', kwargs=kwargs)
save("MLMCEperiment/"+kwargs['epsilon']+"/")
```

```
[ ]: statistics = read_log('../results/MLMCEperiment/0.005/log')
display(statistics)
```

```
[ ]: plot_statistics(statistics, ['E[Qf]', 'V[Qf]'], None)
```

\$ MLMC Experiment epsilon = 0.003 \$

```
[ ]: mpp.clean_data()
kwargs = {'epsilon': '0.003', 'initLevels': '4,5,6', 'initSampleAmount': '8,4,2'}
mpp.run(kernels, config='mlmc_transport', kwargs=kwargs)
save("MLMCEperiment/"+kwargs['epsilon']+"/")
```

```
[ ]: statistics = read_log('../results/MLMCEperiment/0.003/log')
display(statistics)
```

```
[ ]: plot_statistics(statistics, ['E[Qf]', 'V[Qf]'], None)
```

\$ MLMC Experiment epsilon = 0.001 \$

```
[ ]: mpp.clean_data()
kwargs = {'epsilon': '0.001', 'initLevels': '4,5,6', 'initSampleAmount': '8,4,2'}
mpp.run(kernels, config='mlmc_transport', kwargs=kwargs)
save("MLMCEperiment/"+kwargs['epsilon']+"/")
```

```
[ ]: statistics = read_log('../results/MLMCEperiment/0.001/log')
display(statistics)
```

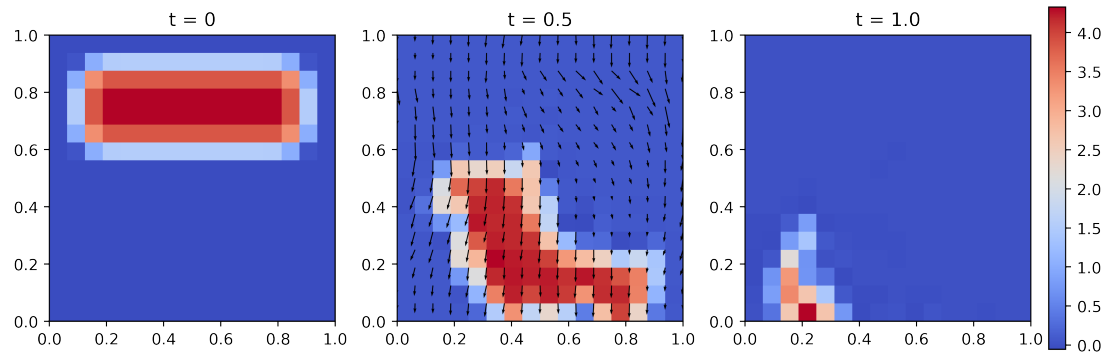
```
[ ]: plot_statistics(statistics, ['E[Qf]', 'V[Qf]'], None)
```

```
[ ]: wd = '../results/MLMCEperiment/'
log_files = ['0.01/log', '0.005/log', '0.003/log', '0.001/log']
mpp.show_combined_mlmc_table(log_files= log_files, wd = wd )
```

\$ Beispielsamples\$

\$ Level 4 (baselevel) \$

```
[3]: solution_3(wd="../results/MLMCEperiment/0.001/vtk/", sample="sample_4_1/
↪", quiver_filter=1, quiver_scale=0.10)
```



\$ Level 5 (und zugehöriges Vergleichssample auf Level 4) \$

```
[ ]: solution_3(wd="../results/MLMCEperiment/0.001/vtk/",sample="sample_coarse_5_1/
↪",quiver_filter=1,quiver_scale=0.10)
```

```
[ ]: solution_3(wd="../results/MLMCEperiment/0.001/vtk/",sample="sample_5_1/
↪",quiver_filter=2,quiver_scale=0.10)
```

\$ Level 6 (und zugehöriges Vergleichssample auf Level 5) \$

```
[ ]: solution_3(wd="../results/MLMCEperiment/0.01/vtk/",sample="sample_coarse_6_0/
↪",quiver_filter=2,quiver_scale=0.12)
```

```
[ ]: solution_3(wd="../results/MLMCEperiment/0.01/vtk/",sample="sample_6_0/
↪",quiver_filter=4,quiver_scale=0.12)
```

\$ Level 7 (und zugehöriges Vergleichssample auf Level 6) \$

```
[ ]: solution_3(wd="../results/MLMCEperiment/0.01/vtk/",sample="sample_coarse_7_0/
↪",quiver_filter=4,quiver_scale=0.12)
```

```
[ ]: solution_3(wd="../results/MLMCEperiment/0.01/vtk/",sample="sample_7_0/
↪",quiver_filter=8,quiver_scale=0.12)
```

```
[ ]: result = tail("../results/MLMCEperiment/0.001/log",n=22)
      levels, sample_amount = parse_nofsamples(result)
      mlmcmeshes(working_dir="../results/MLMCEperiment/0.001/vtk/
↪",levels=levels,sample_amount=sample_amount)
```

\$ Lösung im MLMC Sinne basierend auf gegebenem Zielfunktional (hier Masse zum Zeitpunkt $t = 1.0$)\$

```
[ ]: solution_3(wd="../results/MLMCEperiment/0.001/vtk/",sample="mlmc/
↪",quiver_filter=8,quiver_scale=0.12)
```

[]: