A posteriori error estimation

Spatial refinement

Spatial error estimation refers to classical residual-based error estimation for the zero-th multi index that refers to the mean value. Stochastic error control has to estimate which stochastic mode needs to be refined in the sense that either the polynomial degree is increased or neighbouring stochastic modes are activated. Both is represented by the multi-indices. Then unified error control allows to perform residual-based error estimation for the subresiduals that are associated to each multi-index (see references on the main page for details).

```
Modules = [ExtendableASGFEM]
Pages = ["estimate.jl"]
Order   = [:type, :function]
```

Multi index management

Depending on the model problem and stochastic coefficient the amount of multi indices that should be added to the error estimation varies. Here are some methods that help with enriching the set of multi-indices.

```
Modules = [ExtendableASGFEM]
Pages = ["mopcontrol.jl"]
Order   = [:type, :function]
```

Monte carlo sampling estimator

There is also a hierarchical Monte carlo error estimator available that compares the solution with a higher order discrete solution for sampled deterministic problems. This is merely intended as a way to compute the reference error to assess the efficiency of the residual-based error estimator.

```
Modules = [ExtendableASGFEM]
Pages = ["sampling_error.jl"]
Order   = [:type, :function]
```