DESIGN REVIEW MESH/DISCRETIZATION AUG 9, 2011

* **MESH :** where does ghost cell information exist ?
  + (R) Only at the Discretization level, nothing to do with connectivity
  + (M) Not possible around the current implementation
* **OPERATORS :** 
  + (R) Need to see Discretization, does not see parallelism
  + (B) Not necessary

OPERATORS/VECTOR/MATRICES DISCRETIZATION Geometry

Parallel Decomp. Ghost

(D) Discretization means mapping element

(B) May be we need Two Discretizations for geometry and operators ?

* Geometric Discretization
* Functional Discretization

(R/B) Geo/Func. Discretization are separate Func. is used by Geo. Discretization / Geo. can also be used by Func. Discretization

(M) Not clear in Finite Volume context of separating Geo./Func. Discretization.

- But helps mixed finite element/volume formulation

Geo. Discretization has a pointer to Geometry Object

* + **Vector Space** Dimension (number of points, not physical dimension)

Basis ?

Geometric Vector Space Mesh (Geometric Discretization)

* + **Data (Vectors)**

Iterators ? (Ghost / non-Ghost)

Dof\_map ? Currently sits in mesh and vector engine !!

* + - * + Needs to know or allow for data ordering
        + Needs to know or allow partitioning
        + Pointer to Vector Space (If then else..) Mesh (directly)
        + Decomposition ???
    - Who does make consistent ?
      * (R) Read/write iterators better alternative ?
      * (R) Not sure whether allowing default option for user ??

Read iterator use make consistent for ghost element ?\

* + - * Single iterator with an extra flag ?
      * Epetra Vector allows to set dof\_maps
      * Alternative – local buffer option in dendro
        + Operators work on local copy/local iterators
      * Does makeConsistent need dof\_map ?
  + (R) No need for iterators in geometric vector space
  + (M) Data iterators based on mesh iterators which has a max ghost depth/width
  + (R) Renumbering and partition should be handled by ampmesh

(B) STKmesh – well designed/has contact search, makes life easier -> allow to specify max ghost cell

MOAB – Reactor community

* + (M) Mesh iterator also has ghost cells

Allowing for ghost mesh

Iterators in mesh iterator at construction (debatable)

Need subsetting over ghosted boundary and data iterator

(R) Alternatives for substituting on global iterator

Broader discussion on subset operations like solvers/operators/mesh/vector

(B) having base class for all AMP ?

(S) some unions does not make sense

(R) Template makes it little complicated but has much more clear functionality

(B) base class for check pointing and allow set operations

(R) This could throw run-time errors whereas templates gives you compile errors/

Moving MeshManager to MultiMesh derived from Mesh

Allows for cleaner implementation of subset from multivector of multivariable



