

Canonical Operations

The following operations are used to obtain a fundamental problem formulation (FPF) from the general problem formulation (GPF), which is the maximal connectivity graph:

- Find holes

- An analysis block has a hole if any of its local inputs are not supplied. A hole can be automatically removed or the user can be prompted to introduce a new connection and/or analysis block to satisfy it.

- Removing a hole means removing the entire analysis block associated with it, which could introduce more holes downstream. Therefore a new search but be conducted after a hole is removed.

- Find conflicts

- Two edges are in conflict if they are both directed into the same input or global output. Every conflict involves making a decision, which can be made in four ways:

- User prompt

- Predetermined ranking

- Randomly

- Analysis of the graph using metrics

- A decision only needs to be made when none of the ^{conflicting} edges are fixed.

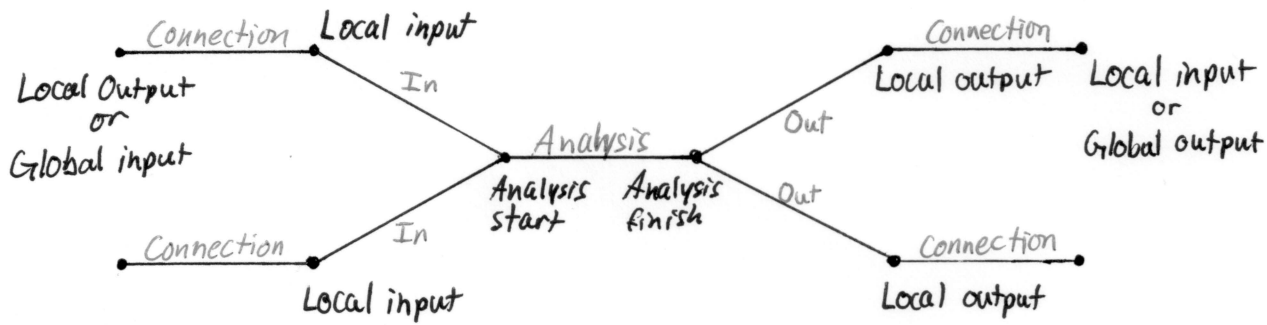
- Remove analysis block

- Removing an analysis block involves removing all the nodes and edges associated with it.

- Analysis blocks with holes should be removed because their outputs cannot actually be realized.

- Removing conflicts may leave some analysis blocks without any used outputs, and these should be removed.

Graph Theory Representation



~~Represent~~

- Edge Attributes:

- type:
 - connection → from outputs to inputs (global or local)
 - analysis → from analysis_start to analysis_finish
 - in → from local_input to analysis_start
 - out → from ~~local_output~~ to analysis_finish to local_output
- weight → used to represent metrics.
- fixed → true/false for whether ~~the~~ the edge may be removed to resolve a conflict.
- rank → A number representing the importance of the edge.

- Node Attributes:

- type:
 - local_input → to distinguish inputs
 - analysis_start } → to contain the analysis edge and represent
 - analysis_finish } the analysis block.
 - local_output → to distinguish outputs
- analysis_block: a string containing the name of the analysis block the node is associated with.