Concept - Presentation
High Quality Hypergraph Partitioning via Max-Flow-Min-Cut Computations

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1 Introduction

- ☑ Problem/Task Description (high-level) and Main Contributions
  - ☑ e.g. *Integration of a framework based on Max-Flow-Min-Cut computations to improve a balanced k-way partition into the n-level hypergraph partitioner KaHyPar*
- ☑ Introduce *hypergrapgs*
- ☑ Define the ϵ-balanced k-way hypergraph partitioning Problem
- ☑ Applications
- ☑ Introduce *multilevel paradigm*
- ☐ Motivation: Disadvantages of *FM* algorithm and why *flow*-based approaches solve these problems
  - ☑ *Move*-based and only incorparates *local* informations
  - ☑ *Zero*-Gain Moves
  - ☐ Flow-based approaches are not move-based and finding the global minimum cut separating two vertices s and t

2 Preliminaries

- ☐ Introduce most important notations
- ☑ Define Flow Problems + Terminology

3 Framework

- ☐ High-level overview of framework (Mixed with related work)
  - ☐ *Active Block Scheduling*
  - ☐ Build region around cut + *Adaptive Flow Iterations*
  - ☐ Solve flow problem on a hypergraph flow network
  - ☐ *Most Balanced Minimum Cut*
- ☑ Flow Networks
  - ☑ Vertex Separator Analogy
  - ☑ Lawler Network
  - ☑ Wong Network
  - ☑ Heuer Network
  - ☑ Hybrid Network
- ☐ Flow Problem Configuration
  - ☐ Modeling of Sanders and Schulz

- ☐ Optimized modeling approach
- ☐ Flow Algorithms
  - ☐ EdmondKarp
  - ☐ GoldbergTarjan
  - ☐ BoykovKolmogorov
  - ☐ Ibfs
- ☐ MBMC on hypergraphs
- ☐ Integration into *KaHyPar*
  - ☐ Flow Execution Policy
  - ☐ Gain-Cache
  - ☐ Speed-Up Heuristics

4 Experiments

5 Conclusion