Università della Svizzera italiana

Institute of Computational Science ICS

High Performance Computing **2019**

Student: FULL NAME Discussed with: FULL NAME

Solution for Assignment 7

Due date: 13 December 2019, 23:59

Graph Partitioning

In this assignment you will implement various graph partitioning algorithms in Matlab and test these methods on a variety of 2D meshes.

1. **Install METIS 5.0.2, KaHIP 2.0, and the corresponding Matlab mex interface** *(10 Points)*

2. **Implement various graph partitioning algorithms in Matlab** *(40 Points)*

Table 1. Edge-cut Results

Mesh	Coordinate	Metis 5.0.2	KaHIP	Spectral	Inertial
grid5rec(10, 80)	10				
grid5rec(80, 10)	10				
gridt(40)					
grid9(40)					
small					
Tapir					
Eppstein					
Airfoil					
cockroach(90)					

3. Visualize the graph partitioning *(10 Points)*

4. Implement in Matlab the recursive k-way partitioning *(10 Points)*

Table 2. Edge-cut results for k-way partitioning and the airfoil mesh.

Mesh	Coordinate	Metis 5.0.2	KaHIP	Spectral	Inertial
k=2					
k=4					
k=8					
k=16					
k=32					

5. Partitioning of realistic large-scale FEM meshes *(30 Points)*

Table 3. Results for 2-way partitioning of the selected FEM mesh.

Metric	Metis 5.0.2	KaHIP
Time (s)		
Partition 1		
Partition 2		
Edge cut		