
INDIAN INSTITUTE OF TECHNOLOGY KHARAGPUR
CS60083 Parameterized Algorithms: Second Class Test

Date of Examination: October 8, 2020

Duration: 50 minutes (for writing answers) + 10 minutes (for taking photos, concatenating, and uploading to moodle)

Full Marks: 20

Department/Center/School: COMPUTER SCIENCE AND ENGINEERING

Special instruction: You can access the Parameterized Algorithms text book that we follow in the class and lecture slides during examination.

Answer all the questions.

1. We are given an r -edge colored graph — each edge of the graph is colored from a color from the set $\{1, 2, \dots, r\}$. Design an FPT algorithm (parameter is r) to compute if there exists a colorful matching — a matching containing exactly one edge of every color.

[10 Marks]

2. Recall the problem of Closest String parameterized by k (You may refer to the lecture slides for this question). Prove that there is a solution for the problem if and only if the ILP discussed in the lecture has a feasible solution. Complete the argument that Closest String parameterized by k has a FPT algorithm and specify the running time of your algorithm (what function will $f(k)$ be and why?).

[10 Marks]

Best of luck
