

# Machine Learning 1 – Exercise 5

Machine Learning for Computer Vision  
TU Dresden

## 1 Clustering

- a) Show that it is sufficient in (7.1) of the lecture notes<sup>1</sup> to consider only chordless cycles.
- b) How many chordless cycles are there in a complete graph with  $n \in \mathbb{N}$  nodes?
- c) Show: For the special case of complete graphs, the graph decomposition problem specializes to the set partition problem.
- d) Define procedures for computing the following differences in cost efficiently:
  - i)  $\varphi(y^{\text{join}_{BC}[\Pi]}) - \varphi(y^\Pi)$ , cf. Algorithm 4 in the lecture notes<sup>2</sup>
  - ii)  $\varphi(y^{\text{move}_{aU}[\Pi]}) - \varphi(y^\Pi)$ , cf. Algorithm 5 in the lecture notes<sup>2</sup>

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<sup>1</sup><https://mlcv.inf.tu-dresden.de/courses/22-winter/ml1/ml1-lecture-notes.pdf>