Summer term 2022
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Linear and Integer Optimization
Assignment Sheet 10
Inofficial English Translation

1. Prove Lemma 68 in the lecture notes, i.e. show that if $y^{(k+1)}$ and $s^{(k+1)}$ are computed as described in the lecture, we have $y^{(k+1)} > 0$ and $s^{(k+1)} > 0$. (5 points)

2. Show that the iterations of the Interior Point Method where $\mu^{(k)}$ is reduced iteratively can be implemented in such a way that all occurring numbers can be stored with a polynomial number of bits. (5 points)

3. Let P be a polyhedron. Show that the problem of finding the largest ball that can be contained in P can be written as a linear program. (5 points)

4. A parcel service leases cars on a basis of 3, 4 or 5 months. The cost for a 3-months leasing contract (for one car) is 1700 EUR, for a 4-months contract 2200 EUR, and for 5-months contract 2500 EUR. For a certain period (e.g. one year), the company knows in advance for each month how many vehicles will be needed in that month. Formulate the problem of finding a cheapest way to lease sufficiently many cars as a linear program. Show in particular that the linear program always has an optimum solution that is integral. (5 points)

Due date: Thursday, June 23, 2022, before the lecture in the lecture hall.