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T able 1: Summary of the parameterized complexity status of the k-anonymity problem; | ? | represents the maximum n umber of di?erent v alues in a column, m represents the number of

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Parameterized Complexity Of K Anonymity Hardness And

Parameterized Complexity of the k-anonymity Problem - CORE We investigate the parameterized complexity of (k, c) -

Attribute-Anonymity when parameterized by c and k. We prove the following result. Theorem 1 (k, c) -Attribute-Anonymity, parametrized by k and c, is not in FPT unless W [2] = FPT. k-Attribute-Anonymity is hard even for k=2 - ScienceDirect

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Then we exhibit a fixed parameter algorithm, when the problem is parameterized by the size of the alphabet and the number of columns. Finally, we investigate the computational (and approximation) complexity of the k-anonymity problem, when restricting the instance to records having length bounded by 3 and $k=3$.

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Parameterized Complexity Of K Anonymity Hardness And complexity of the k-anonymit y problem has been proposed in [7]. Here, we follow the same direction, sho wing that the problem is W[1]-hard when parameterized by the (PDF) Parameterized Complexity of the k-anonymity Problem A precise formalization that has been recently proposed is the k ...

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Parameterized Complexity of the k-anonymity Problem - CORE

Based on this, we develop a polynomial-time data reduction yielding a polynomial-size problem kernel for Degree Anonymity parameterized by the maximum vertex degree. In terms of parameterized complexity analysis, this result is in a sense tight since we also show that the problem is already NP-hard for H-index three, implying NP-hardness for smaller parameters such as average degree and degeneracy.

A refined complexity analysis of degree anonymization in ...

k-Anonymity inO(nm+2t int outt in(t outm+t2 in log(t in))) time,whichcompares favorably with Bonizzoni et al.'s [5] algorithm running in O(2(j+1)mkmn2) time.Sincet out t in,thisshowsthatk-Anonymity is?xed-parametertractable whenparameterizedbyt in.Inparticular,whent in isaconstant,ouralgorithm solvesk-Anonymity intimelinear inthesizeoftheinput.Incontrast,when

This book constitutes the refereed proceedings of the 18th International Symposium Fundamentals of Computation Theory, FCT 2011, held in Oslo, Norway, in August 2011. The 28 revised full papers presented were carefully reviewed and selected from 78 submissions. FCT 2011 focused on algorithms, formal methods, and emerging fields, such as ad hoc, dynamic and evolving systems; algorithmic game theory; computational biology; foundations of cloud computing and ubiquitous systems; and quantum computation.

This book constitutes the thoroughly referred post-proceedings of the 21st International Workshop on Combinatorial Algorithms, IWOCA 2010, held in London, UK, in July 2010. The 31 revised full papers presented together with extended abstracts of 8 poster presentations were carefully reviewed and selected from a total of 85 submissions. A broad variety of combinatorial graph algorithms for the computations of various graph features are presented; also algorithms for network compuation, approximation, computational geometry, games, and search are presented and complexity aspects of such algorithms are discussed.

This thesis presents a study of several combinatorial problems related to social choice and social networks. The main concern is their computational complexity, with an emphasis on their parameterized complexity. The goal is to devise efficient algorithms for each of the problems studied here, or to prove that, under widely-accepted assumptions, such algorithms cannot exist. The problems discussed in Chapter 3 and in Chapter 4 are about manipulating a given election, where some relationships between the entities of the election are assumed. This can be seen as if the election occurs on top of an underlying social network, connecting the voters participating in the election or the candidates which the voters vote on. The problem discussed in Chapter 3, Combinatorial Candidate Control, is about manipulating an election by changing the set of candidates which the voters vote on. That is, there is an external agent who can add new candidates or delete existing candidates. A combinatorial structure over the candidates is assumed, such that whenever the external agent adds or removes a candidate, a predefined set of candidates (related to the chosen candidate) are added or removed from the election. The problem discussed in Chapter 4, Combinatorial Shift Bribery, is also about manipulating an election. Here, however, the external agent can change the way some voters vote. Specifically, a combinatorial structure over the voters is assumed, such that the external agent can change the position of its preferred candidate in sets of voters, following some predefined patterns. The problem discussed in Chapter 5, Election Anonymization, is also about elections. The main concern here, however, is preserving the privacy of the voters, when the votes are published, along with some additional (private) information. The task is to transform a given election such that each vote would appear at least k times. By doing so, even an adversary which knows how some voters vote, cannot identify individual voters. The problems discussed in Chapter 6 and in Chapter 7 are also about privacy. Specifically, a social network (modeled as a graph) is to become publicly available. The task is to anonymize the graph; that is, to transform the graph such that, for every vertex, there will be at least $k - 1$ other vertices with the same degree. By doing so, even an adversary which knows the degrees of some vertices cannot identify individual vertices. In the problem discussed in Chapter 6, Degree Anonymization by Vertex Addition, the way to achieve anonymity is by introducing new vertices. In the problem discussed in Chapter 7, Degree Anonymization By Graph Contractions, the way to achieve anonymity is by contracting as few edges as possible. The main aim of this thesis, considering the problems mentioned above, is to explore some boundaries between tractability and intractability. Specifically, as most of these problems are computationally intractable (that is, NP-hard or even hard to approximate), some restricted cases and parameterizations for these problems are considered. The goal is to devise efficient algorithms for them, running in polynomial-time when some parameters are assumed to be constant, or, even better, to show that the problems are fixed-parameter tractable for the parameters considered. If such algorithms cannot be devised, then the goal is to prove that these problems are indeed not fixed-parameter tractable with respect to some parameters, or, even better, to show that the problems are NP-hard even when some parameters are assumed to be constant. Diese Dissertation stellt eine Untersuchung von verschiedenen kombinatorischen Problemen im Umfeld von

Wahlen und sozialen Netzwerken dar. Das Hauptziel ist die Analyse der Berechnungskomplexität mit dem Schwerpunkt auf der parametrisierten Komplexität. Dabei werden für jedes der untersuchten Probleme effiziente Algorithmen entworfen oder aber gezeigt, dass unter weit akzeptierten Annahmen solche Algorithmen nicht existieren können. Die Probleme, welche im Kapitel 3 und im Kapitel 4 diskutiert werden, modellieren das Manipulieren einer gegebenen Wahl, bei welcher gewisse Beziehungen zwischen den Beteiligten angenommen werden. Dies kann so interpretiert werden, dass die Wahl innerhalb eines Sozialen Netzwerks stattfindet, in dem die Wähler oder die Kandidaten miteinander in Verbindung stehen. Das Problem Combinatorial Candidate Control ONTROL, welches in Kapitel 3 untersucht wird, handelt von der Manipulation einer Wahl durch die änderung der Kandidatenmenge über welche die Wähler abstimmen. Genauer gesagt, gibt es einen externen Agenten, welcher neue Kandidaten hinzufügen oder existierende Kandidaten entfernen kann. Es wird eine kombinatorische Struktur über der Kandidatenmenge angenommen, so dass immer wenn der externe Agent einen Kandidaten hinzufügt oder entfernt, eine vordefinierte Kandidatenmenge (welche mit den ausgewählten Kandidaten in Beziehung steht) ebenfalls hinzugefügt bzw. entfernt wird. Das Problem Combinatorial Shift Bribery, welches in Kapitel 4 untersucht wird, thematisiert ebenfalls die Manipulation einer Wahl. Hier allerdings kann der externe Agent Änderungen des Abstimmungsverhaltens einiger Wähler herbeiführen. Dabei wird eine kombinatorische Struktur über den Wählern angenommen, so dass der externe Agent die Position des von ihm präferierten Kandidaten bei mehreren Wählern entsprechend vordefinierter Muster gleichzeitig ändern kann. Das Problem Election Anonymization, welches in Kapitel 5 untersucht wird, befasst sich ebenso mit Wahlen. Das Hauptanliegen hier ist es jedoch, die Privatsphäre der Wähler bei der Veröffentlichung der Stimmenabgaben zusammen mit einigen zusätzlichen (privaten) Informationen aufrecht zu erhalten. Die Aufgabe ist es eine gegebene Wahl so zu verändern, dass jede Stimmenabgabe mindestens k-fach vorkommt. Dadurch kann noch nicht einmal ein Gegenspieler einzelne Wähler identifizieren, wenn er die Stimmenabgaben einiger Wähler bereits kennt. Die in Kapitel 6 und 7 untersuchten Probleme behandeln gleichermaßen Privatsphärenaspekte. Präziser gesagt, geht es darum, dass ein soziales Netzwerk (modelliert als Graph) veröffentlicht werden soll. Die Aufgabe ist es den Graphen zu anonymisieren; dies bedeutet man verändert den Graphen, so dass es für jeden Knoten mindestens k ? 1 weitere Knoten mit dem selben Grad gibt. Dadurch wird erreicht, dass selbst ein Gegenspieler, welcher die Knotengrade einiger Knoten kennt, nicht in der Lage ist einzelne Knoten zu identifizieren. Bei dem Problem Degree

Anonymization by Vertex Addition, welches in Kapitel 6 untersucht wird, wird Anonymität durch Einführung neuer Knoten erreicht. Bei dem Problem Degree Anonymization by Graph Contractions, welches in Kapitel 7 untersucht wird, wird Anonymität durch die Kontraktion von möglichst wenigen Kanten erreicht. Das Hauptanliegen dieser Dissertation in Bezug auf die obig genannten Probleme ist es die Grenzen der effizienten Lösbarkeit auszuloten. Insbesondere da die meisten dieser Probleme berechnungsschwer (genauer NP-schwer bzw. sogar schwer zu approximieren) sind, werden einige eingeschränkte Fälle und Parametrisierungen der Probleme betrachtet. Das Ziel ist es effiziente Algorithmen für sie zu entwickeln, welche in Polynomzeit laufen, wenn einige Parameter konstante Werte aufweisen, oder besser noch zu zeigen, dass die Probleme "fixed-parameter tractable" für die betrachteten Parameter sind. Wenn solche Algorithmen nicht gefunden werden können, dann ist es das Ziel zu beweisen, dass diese Probleme tatsächlich nicht "fixed-parameter tractable" bezüglich der entsprechenden Parameter sind, oder noch besser zu zeigen, dass die Probleme NP-schwer sind, sogar wenn die entsprechenden Parameter konstante Werte aufweisen.

This volume constitutes the refereed proceedings of the 36th International Symposium on Mathematical Foundations of Computer Science, MFCS 2011, held in Warsaw, Poland, in August 2011. The 48 revised full papers presented together with 6 invited talks were carefully reviewed and selected from 129 submissions. Topics covered include algorithmic game theory, algorithmic learning theory, algorithms and data structures, automata, grammars and formal languages, bioinformatics, complexity, computational geometry, computer-assisted reasoning, concurrency theory, cryptography and security, databases and knowledge-based systems, formal specifications and program development, foundations of computing, logic in computer science, mobile computing, models of computation, networks, parallel and distributed computing, quantum computing, semantics and verification of programs, and theoretical issues in artificial intelligence.

This book constitutes the refereed proceedings of the 20th International Symposium on Fundamentals of Computation Theory, FCT 2015, held in Gda?sk, Poland, in August 2015. The 27 revised full papers presented were carefully reviewed and selected from 60 submissions. The papers cover topics in three main areas: algorithms, formal methods, and emerging fields and are organized in topical sections on geometry, combinatorics, text algorithms; complexity and Boolean functions; languages; set algorithms, covering, and traversal; graph algorithms and networking applications;

anonymity and indistinguishability; graphs, automata, and dynamics; and logic and games.

This book constitutes the refereed proceedings of the Second International Conference on Combinatorial Optimization and Applications, COCOA 2008, held in St. John's, Canada, in August 2008. The 44 revised full papers were carefully reviewed and selected from 84 submissions. The papers feature original research in the areas of combinatorial optimization -- both theoretical issues and and applications motivated by real-world problems thus showing convincingly the usefulness and efficiency of the algorithms discussed in a practical setting.

This thesis deals with degree-constrained graph modification problems. In particular, we investigate the computational complexity of DAG Realization and Degree Anonymity. The DAG Realization problem is, given a multiset of positive integer pairs, to decide whether there is a realizing directed acyclic graph (DAG), that is, pairs are one-to-one assigned to vertices such that the indegree and the outdegree of every vertex coincides with the two integers of the assigned pair. The Degree Anonymity problem is, given an undirected graph G and two positive integers k and s, to decide whether at most s graph modification operations can be performed in G in order to obtain a k-anonymous graph, that is, a graph where for each vertex there are k ? 1 other vertices with the same degree. We classify both problems as NP-complete, that is, there are presumably no polynomial-time algorithms that can solve every instance of these problems. Confronted with this worst-case intractability, we perform a parameterized complexity study in order to detect efficiently solvable special cases that are still practically relevant. The goal herein is to develop fixed-parameter algorithms where the seemingly unavoidable exponential dependency in the running time is confined to a parameter of the input. If the parameter is small, then the corresponding fixed-parameter algorithm is fast. The parameter thus measures some structure in the input whose exploitation makes the particular input tractable. Considering Degree Anonymity, two natural parameters provided with the input are anonymity level k and solution size s. However, we will show that Degree Anonymity is W[1]-hard with respect to the parameter s even if k = 2. This means that the existence of fixed-parameter algorithms for s and k is very unlikely. Thus, other parameters have to be considered. We will show that the parameter maximum vertex degree is very promising for both DAG Realization and Degree Anonymity. Herein, for Degree Anonymity, we consider the maximum degree of the input graph. Considering DAG Realization, we take the maximum degree in a realizing DAG. Due to the problem definition, we can easily determine the maximum degree by taking the maximum over all integers in the given multiset. We provide fixed-parameter algorithms with respect to the maximum degree for DAG Realization and for Anonym E-Ins. The later is the variant of Degree Anonymity when only edge insertions are allowed as modification operations. If we allow edge deletions or vertex deletions as graph modification operations, then we can show that the corresponding variants of Degree Anonymity—called Anonym V-Del and Anonym E-Del—are NP-complete even if the maximum vertex degree is seven. Moreover, we provide strong intractability results for Anonym E-Del and Anonym V-Del proving that they remain NP-complete in several restricted graph classes. Studying the approximability of natural optimization problems associated with Anonym E-Del or Anonym V-Del, we obtain negative results showing that none of the considered problems can be approximated in polynomial time better than within a factor of n^(1/2) where n denotes the number of vertices in the input. Furthermore, for the optimization variants where the solution size s is given and the task is to maximize the anonymity level k, this inapproximability even holds if we allow a running time that is exponential in s. Observe that DAG Realization also can be seen as degree-constrained graph modification problem where only arc insertions are allowed: Starting with an arcless graph, the task is to insert arcs to obtain a realizing DAG for the given multiset. The above classification with respect to the parameter maximum degree shows that in graphs with small maximum degree the modification operation edge respectively arc insertion is easier than vertex or edge deletion. There is a plausible explanation for this behavior: When the maximum degree is small, then there is a high freedom in inserting edges or arcs as for a given vertex almost all other vertices can be chosen as new neighbor. Observe that for DAG Realization the additional requirement that the directed graph shall be acyclic restricts this freedom. In Anonym E-Ins, we do not have restrictions on this freedom. In fact, exploiting this freedom in our implementation for Anonym E-Ins, we show that our theoretical ideas can be turned into successful heuristics and lower bounds. Experiments on several large-scale real-world datasets show that our implementation significantly improves on a recent heuristic and provides (provably) optimal solutions on about 21 % (56 of 260) of the real-world data.

Annotation The two-volume set LNCS 6198 and LNCS 6199 constitutes the refereed proceedings of the 37th International Colloquium on Automata, Languages and Programming, ICALP 2010, held in Bordeaux, France, in July 2010. The 106 revised full papers (60 papers for track A, 30 for track

B, and 16 for track C) presented together with 6 invited talks were carefully reviewed and selected from a total of 389 submissions. The papers are grouped in three major tracks on algorithms, complexity and games; on logic, semantics, automata, and theory of programming; as well as on foundations of networked computation: models, algorithms and information management. LNCS 6199 contains 46 contributions of track B and C selected from 167 submissions as well as 4 invited talks.

In this thesis, we identify and develop simple combinatorial models for four natural team management tasks and identify tractable and intractable cases with respect to their computational complexity. To this end, we perform a multivariate complexity analysis of the underlying problems and test some of our algorithms on synthetic and empirical data. Our first task is to find a team that is accepted by competing groups and also satisfies the agenda of some principal. Extending an approval balloting procedure by an agenda model, we formalize this task as a simple combinatorial model where potential team members are represented by a set of proposals and the competing groups are represented by voters with favorite ballots, that is, subsets of proposals. We show that the underlying problems UNANIMOUSLY ACCEPTED BALLOT and MAJORITYWISE ACCEPTED BALLOT are NP-hard even without an agenda for the principal. Herein, UNANIMOUSLY ACCEPTED

BALLOT asks for a set of proposals that is accepted by all voters and MAJORITYWISE ACCEPTED BALLOT asks for a set of proposals that is accepted by a strict majority of the voters where acceptance means that each voter supports the majority of the proposals. On the positive side, we show fixed-parameter tractability with respect to the parameters "number of proposals" and "number of voters". With respect to the parameter "maximum size of the favorite ballots" we show fixed-parameter tractability for UNANIMOUSLY ACCEPTED BALLOT and W[1]-completeness for MAJORITYWISE ACCEPTED BALLOT. On the negative side, we show W[2]-hardness for the parameter "size of the solution" and NP-hardness for various special cases. Our second task is to partition a set of individuals into homogeneous groups. Using concepts from the combinatorial data anonymization model k-ANONYMITY, we develop a new model which formalizes this task. The information about the individuals is stored in a matrix where rows represent individuals and columns represent attributes of the individuals. The homogeneity requirement of each potential group is specified by a "pattern vector". We show that some special cases of the underlying problem HOMOGENEOUS TEAM FORMATION are NP-hard while others allow for (fixed-parameter) tractability results. We transfer our "pattern vector" concept back to combinatorial data anonymization and show that it may help to improve the usability of the anonymized data. We show that the underlying problem PATTERN-GUIDED k-ANONYMITY is NP-hard and complement this by a fixed-parameter tractability result based on a "homogeneity parameterization". Building on this, we develop an exact ILP-based solution method as well as a simple but very effective greedy heuristic. Experiments on several real-world datasets show that our heuristic easily matches up to the established "Mondrian" algorithm for k-ANONYMITY in terms of quality of the anonymization and outperforms it in terms of running time. Our third task is to effectively train team members in order to ensure that from a set of important skills each skill is covered by a majority of the team. We formalize this task by a natural binary matrix modification problem where team members are represented by rows and skills are represented by columns. The underlying problem is known as LOBBYING in the context of bribery in voting. We study how natural parameters such as "number of rows", "number of columns", "number of rows to modify", or the "maximum number of ones missing for any column to have a majority of ones" (referred to as "gap value") govern the computational complexity. On the negative side, we show NP-hardness even if each row contains at most three ones. On the positive side, for example, we prove fixed-parameter tractability for the parameter "number of columns" and provide a greedy logarithmic-factor approximation algorithm. We also show empirically that this greedy algorithm performs well on general instances. As a further key result, we prove LOGSNP-completeness for constant gap values. Our fourth task is to redistribute teams of equal size. More precisely, one asks to reduce the number of equal-size teams by dissolving some teams, distributing their team members to non-conflicting non-dissolved teams, and ensuring that all new teams are again of equal size. We formalize this task by a new combinatorial graph model. We show relations to known graph models such as perfect matchings, flow networks, and star partitions. On the negative side, we show that the underlying problem is NP-hard even if the old team size and the team size increase are distinct constants. On the positive side, we show that even our two-party variant of the problem is polynomial-time solvable when there are no conflicts or when the districts to dissolve and the districts to win are known. Furthermore, we show fixed-parameter tractability with respect to treewidth when the old team size and the team size increase are constants. In dieser Dissertation identifizieren und entwickeln wir einfache kombinatorische Modelle für vier natürliche Teamverwaltungsaufgaben und untersuchen bezüglich Berechnungskomplexität handhabbare und nicht handhabbare Fälle. Hierzu analysieren wir die multivariate Komplexität der zu Grunde liegenden Probleme und testen manche unserer Algorithmen auf synthetischen und empirischen Daten. Unsere erste Aufgabe ist es ein Team zu finden, welches von einer Gemeinschaft akzeptiert wird und den Vorstellungen (im Folgenden „Agenda“) eines Chefs entspricht. Wir formalisieren diese Aufgabe mit einem einfachen kombinatorischen Modell, indem wir ein bekanntes Verfahren aus dem Wahlkontext durch ein Agendamodell erweitern. In diesem Modell wird die Gemeinschaft durch Wähler mit je einer „Favoritenmenge“ repräsentiert. Wir zeigen, dass die resultierenden Probleme UNANIMOUSLY ACCEPTED BALLOT und MAJORITYWISE ACCEPTED BALLOT NP-schwer sind, sogar wenn es keine Agenda des Chefs gibt. Hierbei fragt UNANIMOUSLY ACCEPTED BALLOT, ob es ein Team gibt, welches von allen Wählern akzeptiert wird. MAJORITYWISE ACCEPTED BALLOT fragt, ob es ein Team gibt, welches von einer strikten Mehrheit der Wähler akzeptiert wird. Akzeptanz bedeutet in diesem Zusammenhang, dass jeder Wähler die Mehrheit der Teammitglieder unterstützt. Auf der positiven Seite zeigen wir „fixed-parameter tractability“ (FPT) für die Parameter „Anzahl an potentiellen Teammitgliedern“ und „Anzahl an Wählern“. Für den Parameter „maximale Größe der Favoritenmengen“ zeigen wir ein FPT-Ergebnis für UNANIMOUSLY ACCEPTED BALLOT und W[1]-Vollständigkeit für MAJORITYWISE ACCEPTED BALLOT. Unsere zweite Aufgabe ist es eine Menge von Individuen in homogene Gruppen zu partitionieren. Unter Ausnutzung von Konzepten des kombinatorischen

Datenanonymisierungsmodells k-ANONYMITY entwickeln wir ein neues Modell, welches diese Aufgabe formalisiert. Dabei werden die Homogenitätsanforderungen jeder potentiellen Gruppe durch einen „Mustervektor“ spezifiziert. Die Informationen über die Individuen sind in einer Matrix gespeichert, wo Individuen durch Zeilen und ihre Attribute durch Spalten repräsentiert werden. Wir zeigen, dass einige Spezialfälle des sich ergebenden Problems HOMOGENEOUS TEAM FORMATION NP-schwer sind während andere FPT-Ergebnisse ermöglichen. Wir übertragen unser „Mustervektorkonzept“ zurück in die Welt der kombinatorischen Datenanonymisierung und zeigen, dass es helfen kann die Nutzbarkeit der anonymisierten Daten zu verbessern. Wir zeigen, dass das zu Grunde liegende Problem NP-schwer ist und ergänzen dies durch ein FPT-Ergebnis bezüglich eines „Homogenitätsparameters“. Aufbauend darauf entwickeln wir sowohl eine ILP-basierte exakte Lösungsmethode als auch eine Heuristik und testen diese in Experimenten mit empirischen Daten. Unsere dritte Aufgabe ist es ein Team effektiv auszubilden, um sicherzustellen, dass aus einer Menge von wichtigen Fähigkeiten jede jeweils von der Mehrheit der Teammitglieder beherrscht wird. Wir formalisieren diese Aufgabe durch ein natürliches Matrixmodifikationsproblem auf binären Matrizen, wobei Teammitglieder durch Zeilen und deren Fähigkeiten durch Spalten repräsentiert werden. Das resultierende

Problem ist bekannt als LOBBYING im Kontext von Bestechung in Wahlen. Wir untersuchen wie natürliche Parameter wie „Anzahl an Zeilen", „Anzahl an Spalten" oder die „maximale Anzahl an fehlenden Einsen pro Spalte um eine Mehrheit an Einsen zu erhalten" (im Folgenden „Gap-Wert") die Berechnungskomplexität unseres Problems beeinflussen. Auf der negativen Seite zeigen wir NP-Schwere, sogar wenn jede Zeile höchstens drei Einsen enthält. Auf der positiven Seite zeigen wir zum Beipiel ein FPT-Ergebnis für den Parameter „Anzahl an Spalten" und entwickeln eine Heuristik mit logarithmischen Approximationsfaktort und testen diese auf empirischen Daten. Als weiteres Schlüsselergebnis zeigen wir, dass unser Problem LOGSNP-vollständig ist für konstante Gap-Werte. Unsere vierte Aufgabe ist es Teams gleicher Größe neu aufzuteilen. Genauer versucht man die Anzahl gleichgroßer Teams zu reduzieren indem man einige Teams auflöst, deren Mitglieder an nicht in Konflikt stehenden verbleibende Teams verteilt und dabei sicherstellt, dass alle neuen Teams wiederum gleich groß sind. Wir formalisieren diese Aufgabe durch ein neues kombinatorisches Graphmodell. Wir zeigen dessen Beziehungen zu bekannten Graphkonzepten wie Perfekten Matchings, Flussnetzwerken, und Sternpartitionen von Graphen. Auf der negativen Seite zeigen wir, dass das zu Grunde liegende Problem NP-schwer ist, sogar wenn die alte Teamgröße und der

Teamgrößenanstieg voneinander verschiedene Konstanten sind. Auf der positiven Seite zeigen wir unter anderem, dass unser Problem in Polynomzeit lösbar ist, wenn es keine Konflikte gibt oder wenn die aufzulösenden und zu gewinnenden Teams bereits bekannt sind.

This book constitutes the thoroughly refereed post-conference proceedings of the 9th International Symposium on Parameterized and Exact Computation, IPEC 2014, in Wroclaw, Poland, in September 2014. The 27 revised full papers presented together with one invited paper were carefully reviewed and selected from 42 submissions. The topics addressed cover research in all aspects of parameterized/exact algorithms and complexity including but are not limited to new techniques for the design and analysis of parameterized and exact algorithms, fixed-parameter tractability results; parameterized complexity theory, relationship between parameterized complexity and traditional complexity classifications; applications of parameterized and exact exponential-time computation; and implementation issues of parameterized and exact exponential-time algorithms.