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NP-COMPLETE PROBLEMS IN LINEAR ALGEBRA

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This research project aims at proving NP-Complete results. Before defining NP-Completeness, background information about computability, Turing machines, time complexity etc. is provided.

The introductory part lays the basic definitions and the terminology is introduced. The next part deals with strings and encoding schemes. Turing machines and problems solvable in polynomial time are discussed before moving on to nondeterminism. The class NP is defined and the relationship between the two classes is dealt with. The class NP-Complete is then defined. A few problems shown to be NP-Complete.

This class of problems is important because, when it is shown that a problem is NP-Complete, we may wish to stop trying to find an efficient algorithm for it. Instead, we may try to find an algorithm for a special instance or come up with an approximation algorithm.

Key terms: Decision problem, string, formal language, encoding scheme, intractable problems, incomputable problems, Deterministic Turing Machine (DTM), polynomial time, Class P, Nondeterministic Turing Machine (NDTM), Nondeterministic Polynomial time, Class NP, polynomial transformation, NP-Completeness.