

Modern Complexity Theory

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Chapter 1

Proofs

1.1 Social Choice Theory

X is a set of all alternatives. $X = 1, 2, \dots, k = [k]$. $[k]$ will be used to denote a set in this course.

$\pi_1 = (3, 2, \dots, k, 4) \rightarrow$ permutation of X .

$S_k =$ set of permutation of $1, 2, \dots, k$

$$|S_k| = k!$$

Society consists of n people preference profile.

$$\pi = (\pi_1, \pi_2, \dots, \pi_n) \in S_k^n$$

Goal: Aggregate π to obtain a "good" preference for the society

$$F : S_k^n \rightarrow S_k$$

Here F is called Social Choice Function

1.1.1 Arrow's Theorem (Kenneth Arrow)

Nobel Prize to Arrow, Sen for this Theorem.

Partial Orderings: