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**Sinopsis**

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Lectures on  $NX(p)$  deals with the question on how  $NX(p)$ , the number of solutions of mod  $p$  congruences, varies with  $p$  when the family  $(X)$  of polynomial equations is fixed. While such a general question cannot have a complete answer, it offers a good occasion for reviewing various techniques in  $l$ -adic cohomology and group representations, presented in a context that is appealing to specialists in number theory and algebraic geometry.

Along with covering open problems, the text examines the size and congruence properties of  $NX(p)$  and describes the ways in which it is computed, by closed formulae and/or using efficient computers.

The first four chapters cover the preliminaries and contain almost no proofs. After an overview of the main theorems on  $NX(p)$ , the book offers simple, illustrative examples and discusses the Chebotarev density theorem, which is essential in studying Frobenian functions and Frobenian sets. It also reviews  $l$ -adic cohomology.

The author goes on to present results on group representations that are often difficult to find in the literature, such as the technique of computing Haar measures in a compact  $l$ -adic group by performing a similar computation in a real compact Lie group. These results are then used to discuss the possible relations between two different families of equations  $X$  and  $Y$ . The author also describes the Archimedean properties of  $NX(p)$ , a topic on which much less is known than in the  $l$ -adic case. Following a chapter on the Sato-Tate conjecture and its concrete aspects, the book concludes with an account of the prime number theorem and the Chebotarev density theorem in higher dimensions.