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Abstract: Quadratic forms over fields F with char(F) 6= 2 are degree two homogeneous polynomials in finite number of variables. A linear change in these variables produces an equivalent quadratic form. In general, over an arbitrary field, or when the number of variables is too large, identifying invariants which classify quadratic forms, up to equivalence, is a difficult task. However, the classification is much easier when the underlying field is a local field. In this case, very few invariants, namely dimension, discriminant and Hasse invariant are enough to make this classification. This, in view of a local-global principle called Hasse-Minkowski theorem, leads to the study of quadratic forms over number fields. In this expository thesis, we aim to study these topics. We also aim to classify small dimensional quadratic forms over arbitrary fields. Since quadratic forms can be used to construct involutions on matrix algebras, an attempt is also made to study invariants over central simple algebras, and to use them for classification of involutions of first type.

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