1106-VX-681 **Brian G. Kronenthal*** (kronenthal@kutztown.edu), Kutztown University, Department of Mathematics, P.O. Box 730, Kutztown, PA 19530, and **Felix Lazebnik**. *When Can You Factor a Quadratic Form?*

Let $\mathbb{F}$ be a field and n a positive integer. A polynomial $Q \in \mathbb{F}[X_1, \ldots, X_n]$ of the form

$$Q = Q(X_1, \ldots, X_n) = \sum_{1 \leq i,j \leq n} a_{ij} X_i X_j,$$

where $a_{ij} = a_{ji}$ for all i and j, is called a *quadratic form*. The polynomials

$$X_1^2 + X_1 X_2$$

and

$$2X_3^2 + 2X_1X_2 - X_1X_3 - 4X_2X_3 - 6X_3X_4 + 3X_1X_4$$

are examples.

Consider the problem of determining, without using a computer or calculator, whether a given quadratic form factors into the product of two linear forms. It is often highly nontrivial to derive a solution by inspection. However, we can take advantage of equivalent conditions, which we will discuss in this talk. Furthermore, we will highlight vocabulary such as "reducible," "degenerate," and "singular" that is used in the literature to describe these conditions, as well as highlight the inconsistency with which this vocabulary is applied. (Received September 04, 2014)