1042-11-72   **Andrew G. Earnest*** (`aearnest@math.siu.edu`), Department of Mathematics, Southern Illinois University Carbondale, Carbondale, IL 62901, and **Robert W. Fitzgerald** (`rfitzg@math.siu.edu`), Department of Mathematics, Southern Illinois University Carbondale, Carbondale, IL 62901. *Multiplicative Properties and Parametrization of Integral Binary Quadratic Forms.*

A binary integral quadratic form will be said to be k-multiplicative for a positive integer k (or simply multiplicative when $k = 2$) if the set of values that it represents at integer points is closed under k-fold products. Arnold (2003) initiated the study of multiplicative forms (that is, those binary forms for which the represented value set is a multiplicative semigroup), which he referred to as perfect forms. In this talk, a characterization will be given for k-multiplicative forms for all even positive integers k. These properties will be seen to distinguish the elements of odd order in the form class group of a given discriminant. Further, it will be shown that this closure under k-fold products can always be expressed in terms of a k-linear mapping from $(\mathbb{Z}^2)^k$ to $\mathbb{Z}^2$. In the case $k = 2$, this resolves a conjecture of Aicardi and Timorin (2007). From the description of classical Gaussian composition given by Bhargava (2004), it follows that the primitive multiplicative forms can be parametrized in a particular manner. The problem of determining which imprimitive multiplicative forms can be parametrized in this way will also be discussed in this talk. (Received August 08, 2008)