1118-11-114 **Byungchul Cha*** (cha@muhlenberg.edu), **Emily Nguyen** (en247768@muhlenberg.edu) and **Brandon Tauber** (bt247069@muhlenberg.edu). *A tree of Pythagorean triples and its generalization.* Preliminary report.

It is known that all primitive Pythagorean triples (x, y, z), that is, all positive integer triples (x, y, z) without common factor satisfying $x^2 + y^2 - z^2 = 0$, can be given a certain tree-like structure. More precisely, if (x, y, z) is such a triple with y even, then there exists a unique sequence $\{k_1, \ldots, k_l\}$ with $k_j \in \{1, 2, 3\}$ such that $(x, y, z)^T = M_{k_1} \cdots M_{k_l} (3, 4, 5)^T$ with

$$M_1 := \begin{pmatrix} 1 & -2 & 2 \\ 2 & -1 & 2 \\ 2 & -2 & 3 \end{pmatrix}, \quad M_2 := \begin{pmatrix} -1 & 2 & 2 \\ -2 & 1 & 2 \\ -2 & 2 & 3 \end{pmatrix}, \quad M_3 := \begin{pmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 3 \end{pmatrix}.$$

We present a generalization of this theorem to different quadratic forms other than the Pythagorean one. (Received January 26, 2016)