

1077-11-2569

Noam D. Elkies* (elkies@math.harvard.edu). *Families of marked elliptic curves, with some applications.*

We outline an approach to constructing families of elliptic curves marked with a given configuration of integral points in their Mordell-Weil groups. Some of the resulting parametrizations have already appeared in various contexts, ranging from classical formulas for modular curves $X_1(N)$ and the elliptic curves they parametrize, to recent results of Bhargava and others on average ranks of elliptic curves. We give some other motivations and applications, such as: elliptic curves (and surfaces) with a point (or section) of nonzero height that has many integral multiples; rational functions of low degree on $X_1(N)$ for large N ; and elliptic curves of low conductor or discriminant and moderately large rank in a given family, such as all elliptic curves over \mathbf{Q} or $\mathbf{Q}(\sqrt{5})$, or curves with a 2- or 3-torsion point, or of j -invariant 0 or 1728. (Received September 22, 2011)