1147-11-479 **Travis Morrison*** (`travis.morrison@uwaterloo.ca`). *Hilbert's tenth problem, diophantine definability, and number theory.*

Hilbert's tenth problem is to give an algorithm which decides on input $f \in \mathbb{Z}[x_1, \ldots, x_n]$ whether or not $f$ has a root in $\mathbb{Z}^n$. By the work of Davis-Putnam-Robinson and Matiyasevich, such an algorithm can not exist. It is open whether such an algorithm can exist for H10 over $\mathbb{Q}$, i.e. the same problem but over $\mathbb{Q}$ instead of $\mathbb{Z}$. If $\mathbb{Z}$ had a diophantine definition (in the language of rings) as a subset of $\mathbb{Q}$, i.e. one involving only existential quantifiers, then H10 would be undecidable as well. Such a definition may not exist, but Koenigsmann shows there is a universal definition of $\mathbb{Z}$ in $\mathbb{Q}$, or in other words, $\mathbb{Q} - \mathbb{Z}$ is diophantine over $\mathbb{Q}$. I will discuss this result and its generalization to number fields, due to Park, and to global function fields, which is joint work with Eisenträger. These definitions are built using ideas from class field theory, the arithmetic of quaternion algebras, and local-global principles. (Received January 24, 2019)