Correction to Lectures 20 and 23

I made a sign error in the Artin map in Lectures 20 and 23. I will give the correction in the general setting of Lecture 23; the same correction applies to the special case of the cyclotomic extensions in Lecture 20.

Let K be a local field & $\pi \in K$ a uniformizer. Let L_n be the field of π^n-division points of F, a choice of Lubin–Tate formal $\mathcal{O}_K$-module for π. Set $L_\infty = \bigcup_{n=1}^{\infty} L_n$, and let $F(n)$, $n \geq 1$ be as in lectures

The correct formula for the Artin map is

$$\begin{array}{ccc} K^\times & \xrightarrow{\mathrm{Art}_K} & W(K^{ab}|K) \\ \| \wr & & \downarrow \wr \\ \langle \pi \rangle \times \mathcal{O}_K^\times & \xrightarrow{\sim} & W(K^{ur}|K) \times \mathrm{Gal}(L_\infty|K) \\ (\pi^m, u) & \longmapsto & (\mathrm{Frob}_K^m, \sigma_u^{-1}) \end{array}$$

$$\sigma_u(\lambda) = [u]_F(\lambda) \text{ for any } \lambda \in \bigcup_{n \geq 1} F(n).$$

In Lecture 23 I had written

$$(\pi^m, u) \longmapsto (\mathrm{Frob}_K^m, \sigma_u).$$

While this formula gives an isomorphism $K^\times \cong W(K^{ab}|K)$, it is not independent of the choice of π, and is not the Artin map.

Aside:

There are in fact two different ways of defining the Artin map in the literature. The one I ~~[illegible]~~ used is referred to as

"uniformizers go to arithmetic Frobenius elements"

The "arithmetic" Frobenius here is the element I called Frob_K (or a lift of it, to $W(K^{ab}|K)$).

The other convention, with slogan

"uniformizers go to geometric Frobenius elements"

is

$$(\pi^m, u) \longmapsto (\mathrm{Frob}_K^{-m}, \sigma_u)$$

The "geometric" Frobenius here is Frob_K^{-1}, and the Artin map with this ~~[illegible]~~ convention is just the inverse of the Artin map with the other convention.