ABSTRACT. For a simple connected planar graph G with a contractible circuit J and a partition ϕ of the vertex set of J we denote by $P_{(\mathsf{G},\phi)}(t)$ the number of ways of colouring the vertices of G with at most t colours so that vertices in the same block of ϕ have the same colour. Tutte showed that this polynomial may be expressed uniquely as a linear combination of $P_{(\mathsf{G},\pi)}(t)$ over all planar partitions π, with scalars $\vartheta_{\phi,\pi}(t)$ that are independent of G. We show that the (chromatic) invariants $\vartheta_{\phi,\pi}$ have a natural algebraic setting in terms of the orthogonal projection from the Partition Algebra $\mathbb{P}_r(t)$ to the Temperley-Lieb Subalgebra $\mathbb{TL}_r(t,1)$.

We define the genus of a partition and give an extension of the invariants to arbitrary genus g. We consider a graded filtration of $\mathbb{P}_r(t)$ which serves as a natural setting for partitions of genus at most g. We also introduce a lift of the Partition Algebra, which we call the Ribbon Algebra, an algebra that is worthy of further study.

Finally, we summarise the rôle of the genus 0 invariants in the algebraic approach of Birkhoff and Lewis to the Four Colour Theorem.