Z-knotted triangulations of surfaces

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Petrie polygons are well-known objects described by Coxeter. These are skew polygons in regular polyhedra such that any two consecutive edges, but not three, are on the same face. Analogs of Petrie polygons for graphs embedded in surfaces are called *zigzags*. They have many applications, for example, they are successfully exploited to enumerate all combinatorial possibilities for fullerenes. The case when an embedded graph has a single zigzag is closely connected to Gauss code problem. An embedded graph with a unique zigzags is said to be *z-knotted*.

We investigate zigzags in triangulations of closed (not necessarily orientable) surfaces and show that every such triangulation admits a z-knotted shredding. Our main tool is the concept of z-monodromy. We describe all possibilities for z-monodromies of faces in triangulations: there are precisely 7 types of z-monodromies and 4 types corresponding to the z-knotted case.