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Linking in torus bundles and Hecke L functions

Torus bundles over the circle are among the simplest and cutest examples of 3-dimensional manifolds. After presenting some of these examples, using in particular animations realized by Jos Leys, I will consider periodic orbits in these fiber bundles over the circle. We will see that their linking numbers — that are rational numbers by definition — can be computed as certain special values of Hecke L-functions. Properly generalised this viewpoint makes it possible to give new topological proof of now classical rationality or integrality theorems of Klingen-Siegel and Deligne-Ribet. It also leads to new related results that I will briefly allude to. All this is extracted from joint works with Pierre Charollois, Luis Garcia and Akshay Venkatesh.