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*Topological graph theory in DNA self-assembly and DNA recombination*

DNA self-assembly of branched junction molecules as well as DNA origami can yield a variety of DNA based nanostructures such as spatial graphs and meshes. On the other side, natural template guided DNA recombination processes can be also modeled by four regular spatial graphs. In both cases, DNA structures can be represented as ribbon graphs (surfaces with boundaries) where the boundary components correspond to the DNA strands. Being able to experimentally address these strands can help to identify the structure. We address questions about the boundary components (DNA strands) that traverse such nano structures and their genus ranges.