1167-05-143 **Joanna A. Ellis-Monaghan***, jellismonaghan@gmail.com, and **Mark N. Ellingham**.
Edge-outer embeddability: conditions and constructions. Preliminary report.

A graph is edge-outer embeddable if it has an orientable embedding with a special face whose boundary uses every edge at least once. While every graph has such an edge-outer embedding, finding one with a minimum size special face is NP-hard. This problem shifts the attention of graph embedding from the number of faces in the embedding to their sizes, with many natural questions arising. For example, it is not known if this special face can be specified in advance, nor the extent to which edge-outer embeddability can be extended to digraphs. We begin with the case of Eulerian graphs and digraphs, and determining edge-outer embeddability with two equal size faces. We put this problem in the context of DNA self-assembly, compatible Euler circuits, and tournament embeddings, and then present some necessary and some sufficient conditions for graphs and digraphs to have such edge-outer embeddings. (Received March 04, 2021)