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and **Jonathan L. Gross** (gross@cs.columbia.edu). *Genus Distribution of  $P_3 \times P_n$ .*

Genus distributions for various ladder-type graphs have been computed during the last couple of decades. This work represents the next natural step, i.e. the computation of the genus distribution of the grid-like graph family  $P_3 \times P_n$  using *productions* and *double-root partials*. Double-root partials are defined for a *double-rooted graph* (i.e. a graph with two vertices designated as roots). They capture the various ways in which the two root vertices appear in face-boundary walks of embeddings. These partials are used in deriving productions that help compute the effect of operations like vertex- or edge-amalgamation on the genus distribution of graphs. We use these productions to derive recurrences for computing the genus distribution of an intermediate graph  $X_{n-1}$  (that is homeomorphic to  $P_3 \times P_n$  minus an edge), using a new kind of surgical operation more complicated than a vertex- or an edge-amalgamation. These recurrences are then used to compute the genus distribution of  $P_3 \times P_n$  by the use of productions for edge-addition between the two root vertices of a double-rooted graph, as derived in our earlier work (to be published). Productions and partials were first defined and used in Gross, Khan & Poshni's work in 2010. (Received September 22, 2011)