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Patricia R Cahn* (patricia.cahn@dartmouth.edu), 6188 Kemeny Hall, Dartmouth College, Hanover, NH 03755. *A Generalization of Turaev's Virtual String Cobracket and the Homotopy Rank of a Virtual String*. Preliminary report.

Turaev introduced a Lie cobracket on the free \mathbb{Z} -module generated by nontrivial homotopy classes of virtual strings. This cobracket gives an estimate on the minimal number of self-intersection points of a string in a given virtual homotopy class. We introduce an operation μ which can be viewed as a generalization of Turaev's cobracket, and this operation also gives an estimate on the minimal self-intersection number. We show that the estimate given by μ is better than the estimate given by Turaev's cobracket. We also provide a class of strings α such that $\mu(\alpha)$ gives an exact formula for the minimal self-intersection number of α rather than an estimate. (Received September 22, 2010)