

Slice surface from band presentation

- Given a band presentation we can construct a ribbon surface. The Ribbon Genus depends only the number of bands k and the number of strands n : [Rudolph, 1983]

- $$g_r(K) \leq \frac{1 + rk(x) - n}{2}$$

- Furthermore
$$g_s(K) = \frac{1 + rk(x) - n}{2} \Rightarrow g_s(K) = g_r(K)$$

- **Slice-Ribbon conjecture:** Is $g_s(K) = g_r(K)$ true for all knots? (typically genus 0)

Overview: upper bound methods

- Construct an algorithm for computing rank in the free group.
- Adapt the algorithm for braid groups.
- Test its effectiveness on braids in the KnotInfo database.