

Example

- $x = 123\bar{1}$
- Length $\Rightarrow rk(x) \leq 4$
- Exponential Sum: $\omega(x) = 2 \Rightarrow rk(x) \geq 2$
- Band presentation: $(123\bar{1}) = (12\bar{1})(13\bar{1}) \Rightarrow rk(x) = 2$

Overview: computing ribbon genus

- What is the slice genus and ribbon genus of a knot?
- How is it related to the rank?