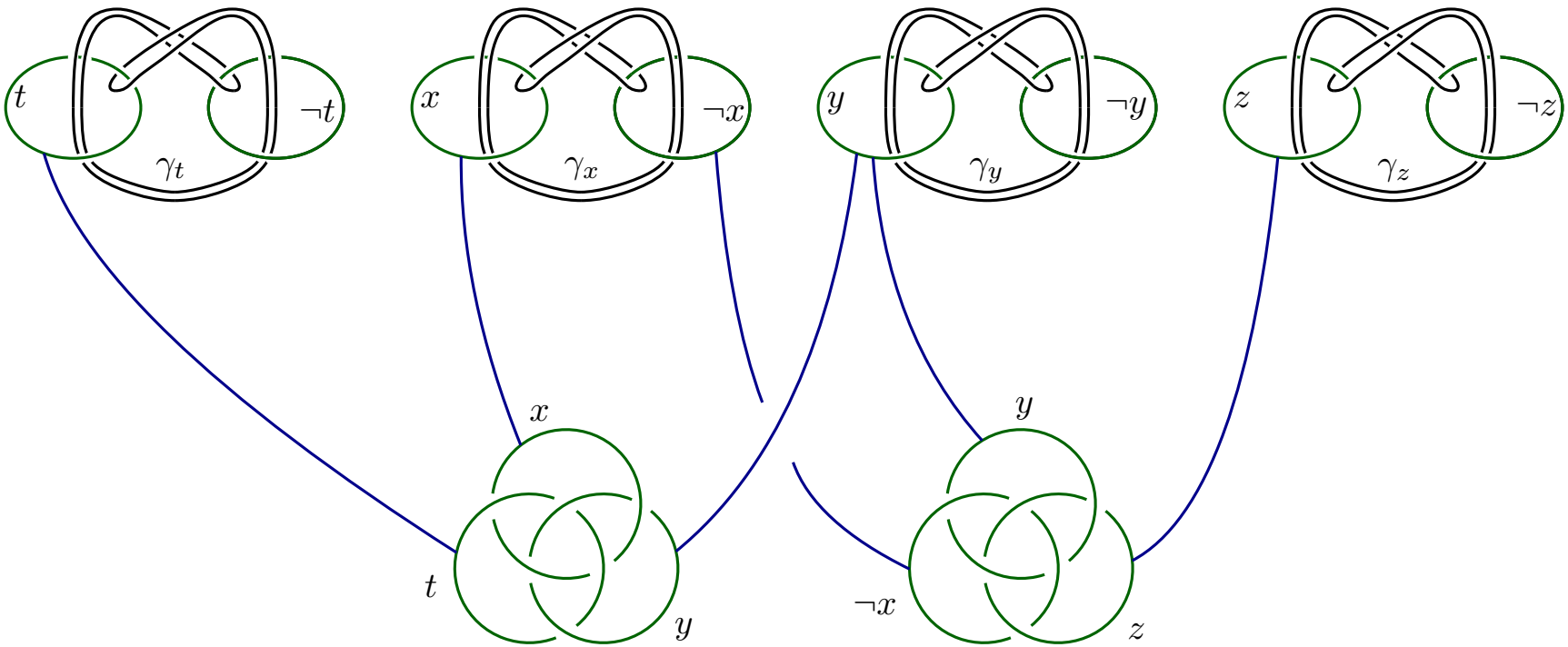
Hard embedding problems in three dimensions

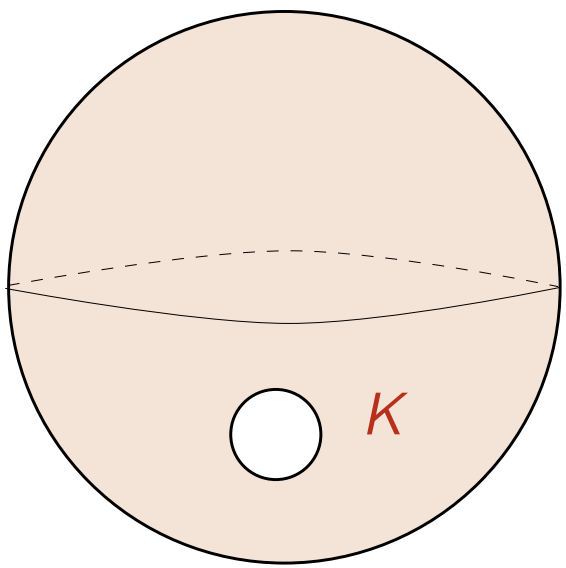
Arnaud de Mesmay (CNRS, Grenoble)



Based on joint works with Ben Burton, Yo'av Rieck, Eric Sedgwick, Martin Tancer and Uli Wagner.

Embedding surfaces

1-in-3 SAT instance: $\begin{cases} c_1 = (x_1, x_2, \bar{x_3}) \\ c_2 = (x_1, \bar{x_2}, x_3) \end{cases}$



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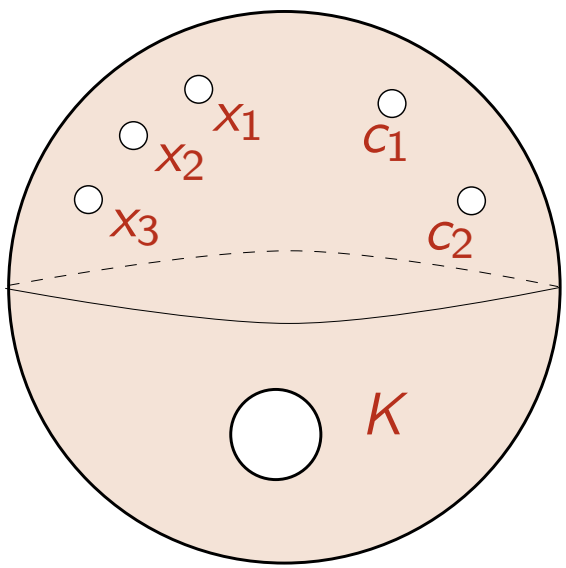

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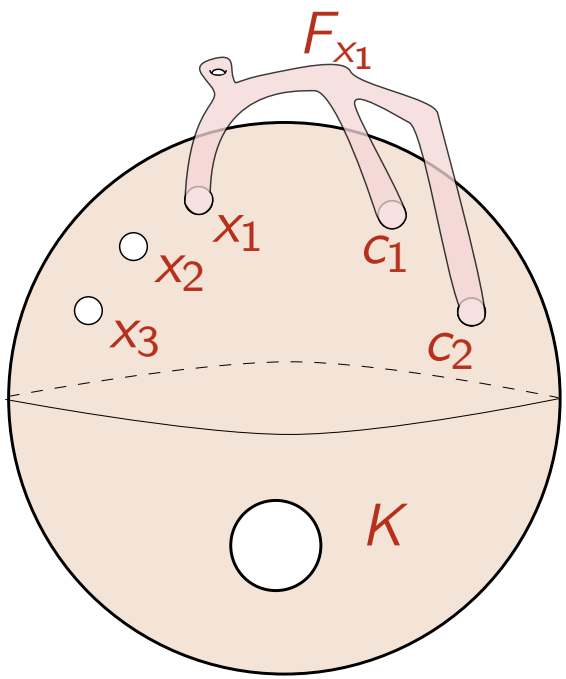

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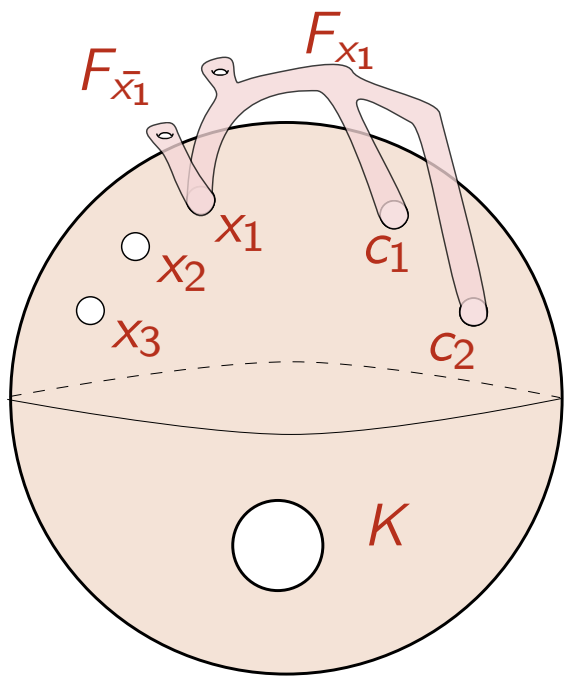

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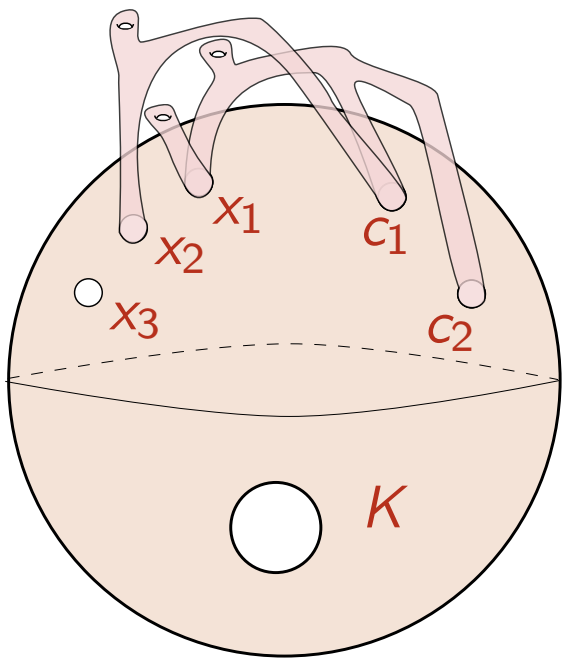

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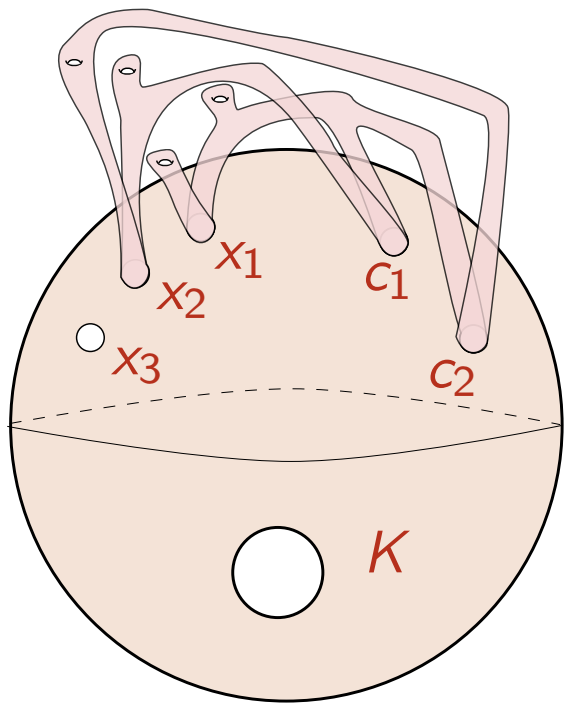

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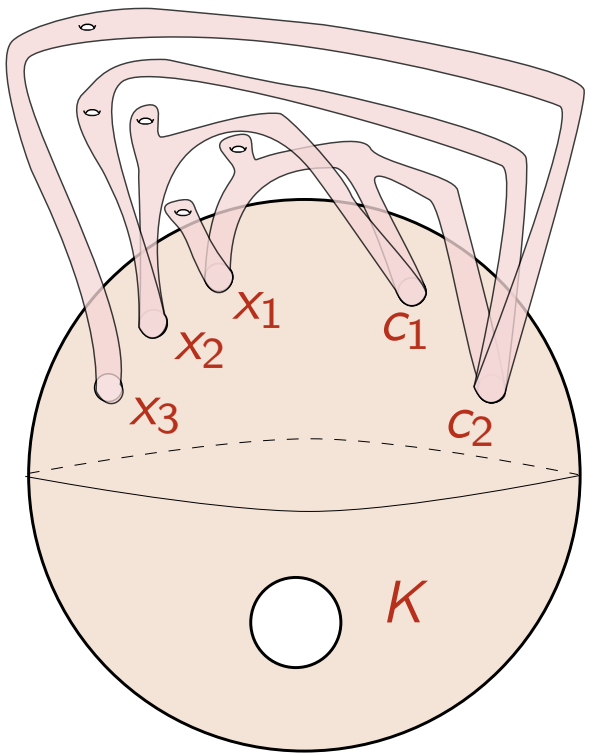

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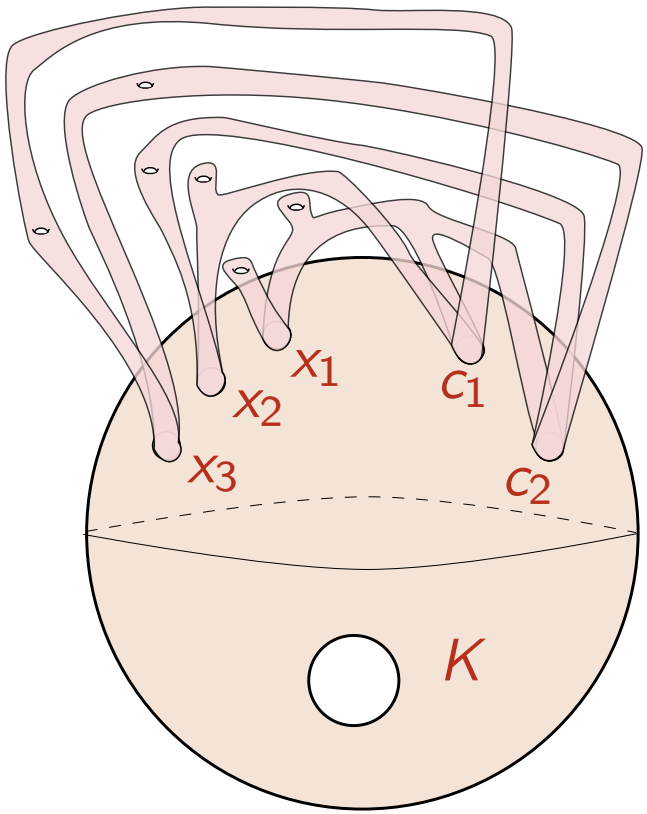

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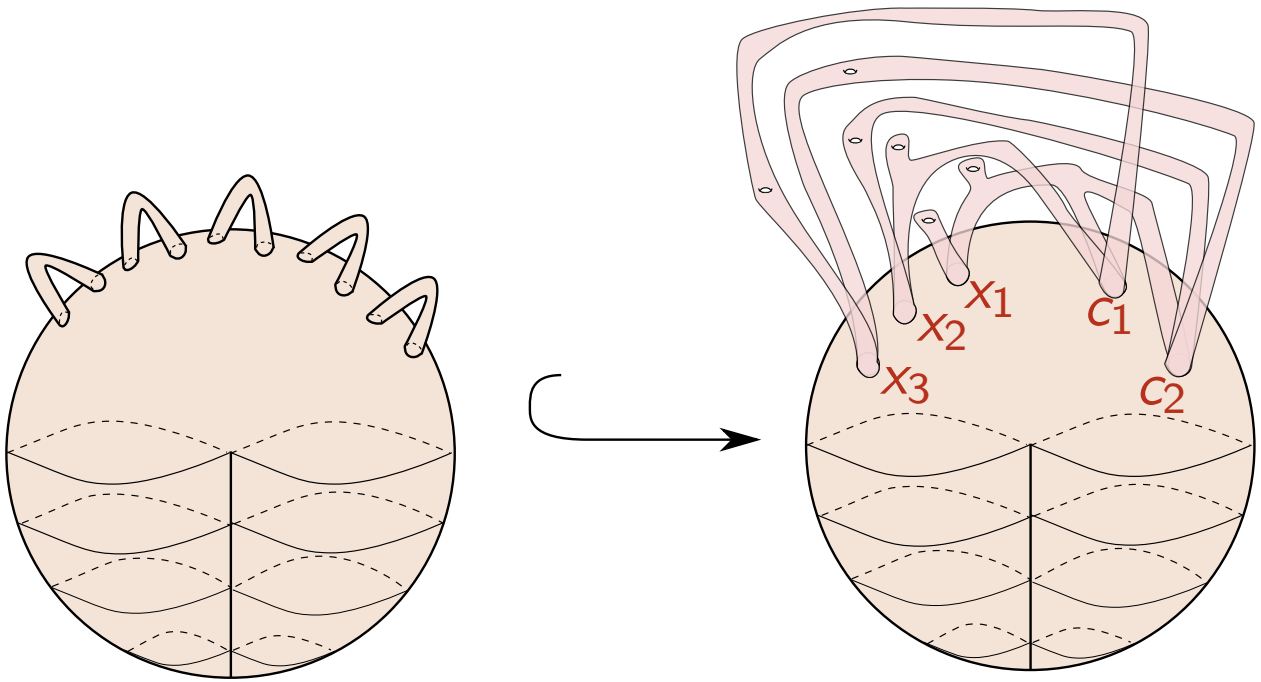
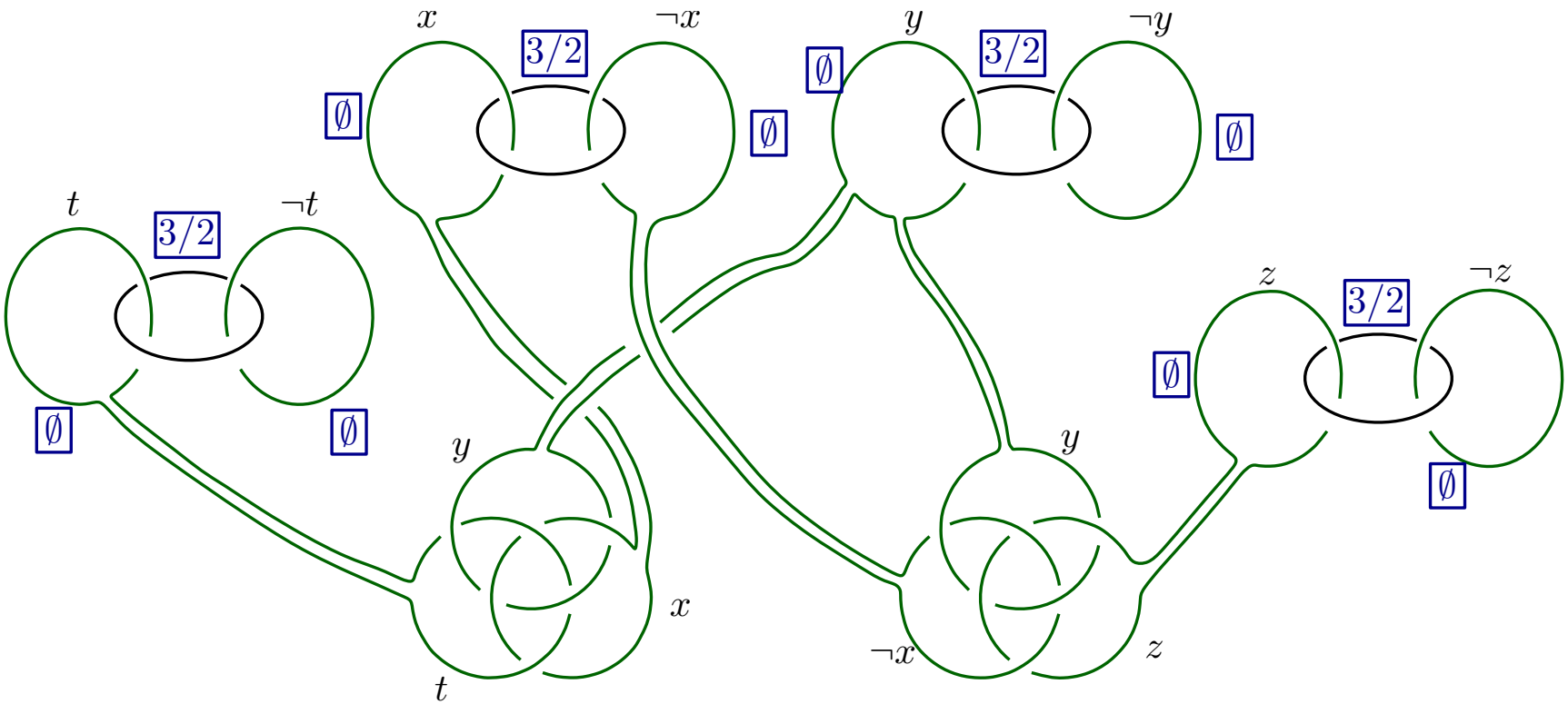
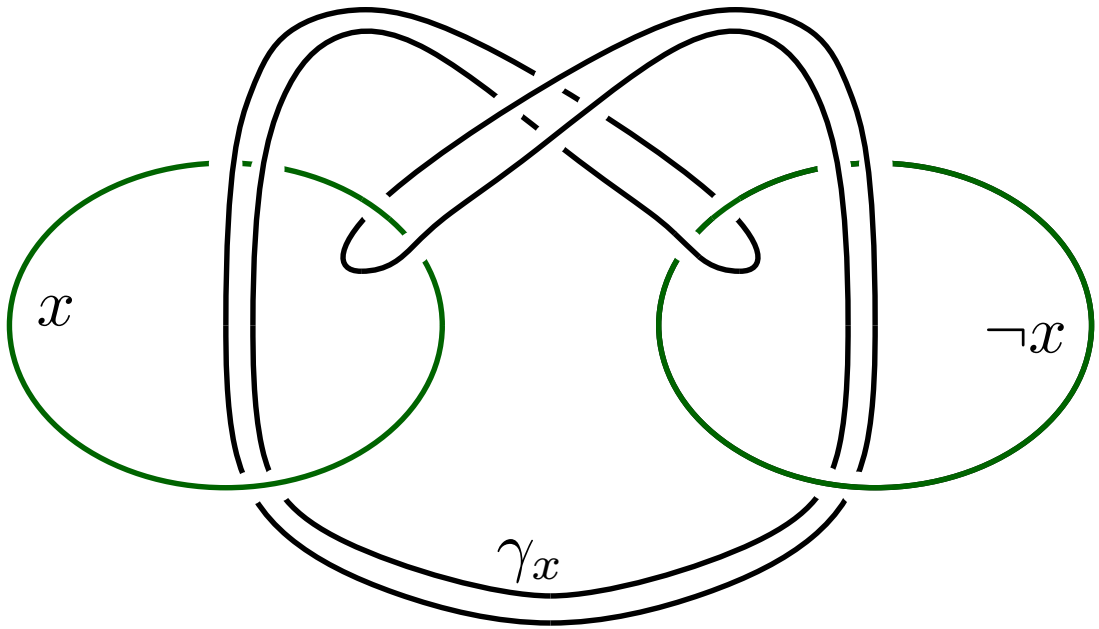


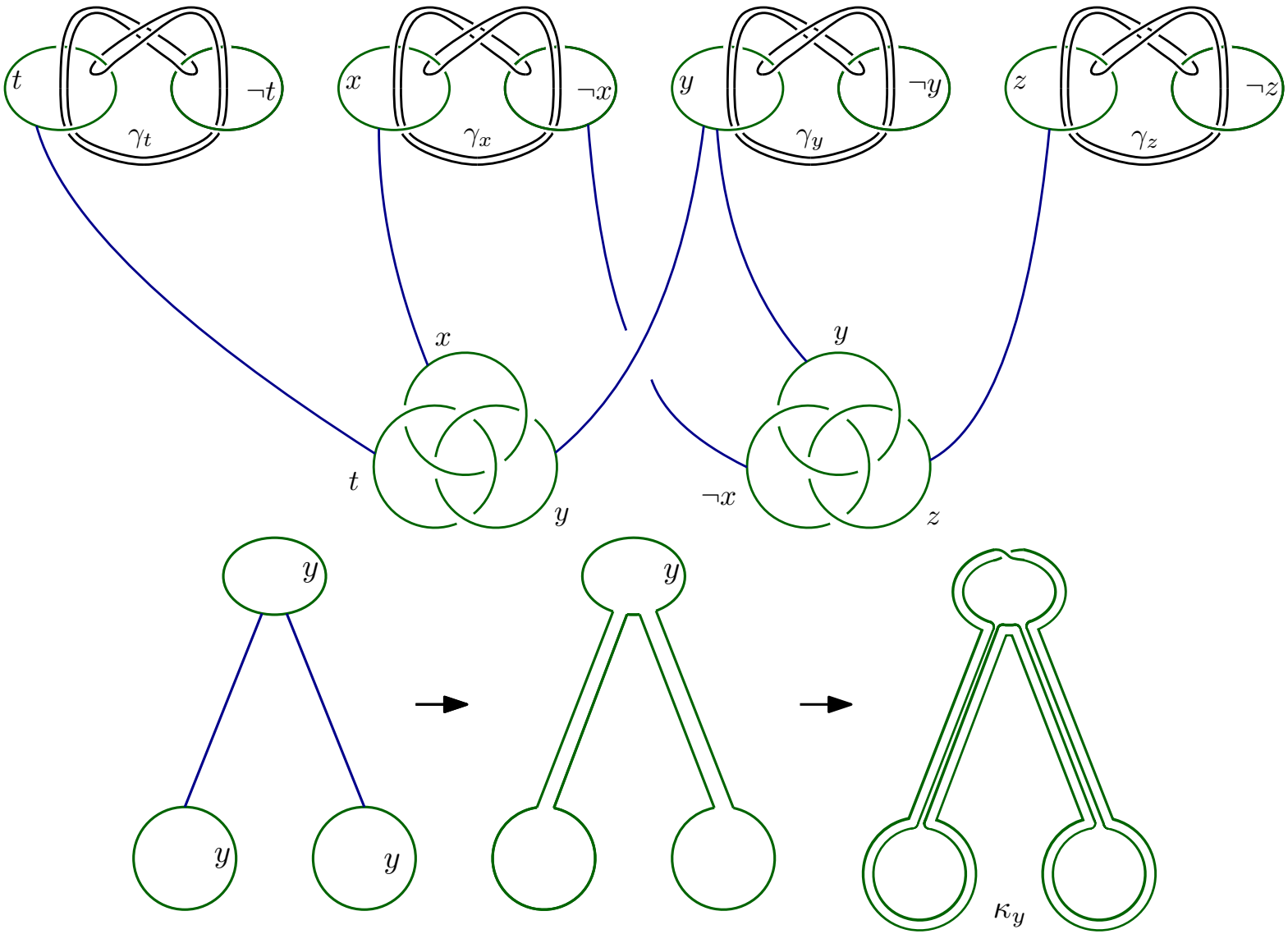
Proto-reduction



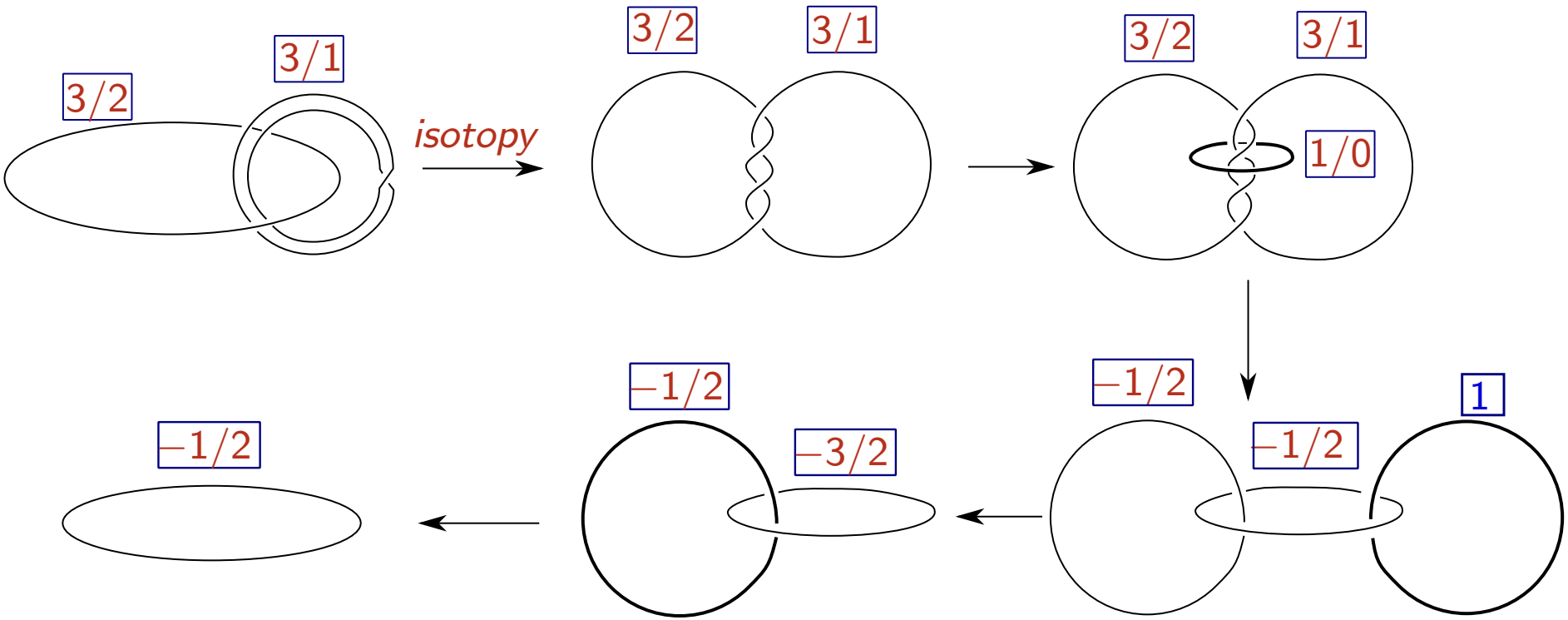
A more complicated clasp



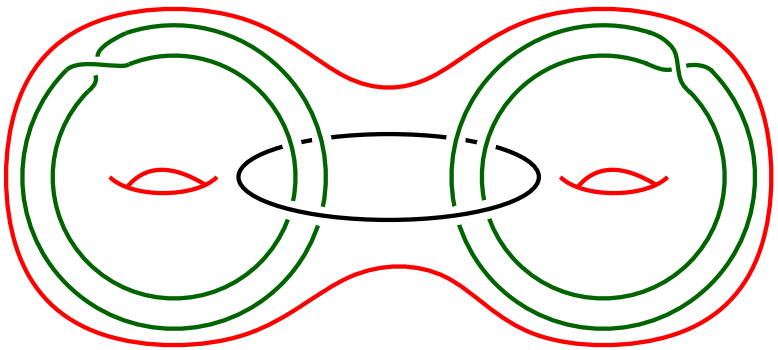
The full thing



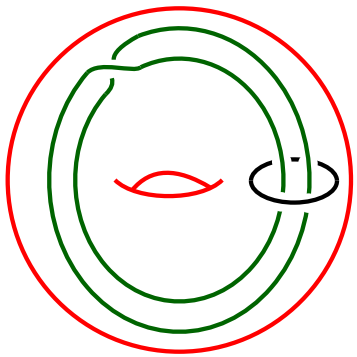
The easy direction still works



Incompressible surfaces



genus 2



genus 1

Incompressible surfaces