

# Minimal free resolutions of fiber products

*Hugh Geller*, Clemson University, Clemson, SC – 29634

## Abstract

In 2006, Visscher gave an explicit construction for the minimal free resolution of the fiber product  $k[\underline{x}] \times_k k[\underline{y}]$  over  $k[\underline{x}, \underline{y}]$  where  $k$  is a field and  $\underline{x}$  and  $\underline{y}$  are distinct lists of variables. In this talk, we rephrase Visscher's construction in terms of Koszul complexes. From there, we show how to use this construction along with the minimal free resolutions of  $k[\underline{x}]/\mathcal{I}$  and  $k[\underline{y}]/\mathcal{J}$ , where  $\mathcal{I} \subseteq \langle \underline{x} \rangle^2$  and  $\mathcal{J} \subseteq \langle \underline{y} \rangle^2$ , to obtain a minimal free resolution of  $k[\underline{x}]/\mathcal{I} \times_k k[\underline{y}]/\mathcal{J}$ .

**Keywords:** free resolution, fiber product, Koszul complex.