Geometric engineering: counting bundles in two and three dimensions

Abstract:

"Geometric engineering, an idea originating in string theory based on the well-known identity 2 x 2 + 2 x 3 = 10, gives a correspondence between certain algebro-geometric spaces in two and three complex dimensions. It predicts a surprising equality between partition functions, generating series which count bundles (and more generally torsion-free sheaves) on the spaces involved. I will discuss some of the mathematical ideas going into the construction, mainly in the simplest example corresponding to the gauge group U(1), and indicate how one might promote the equality of functions to an isomorphism of vector spaces."