

# Examples of $\mathbb{G}_a$ -actions on cylinders over Danielewski hypersurfaces

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Given a polynomial of the form  $P_n = x^n z - y^2 + 1$ , consider the affine hypersurface  $S_n$  in affine complex three-space defined by  $P_n = 0$ . It is well-known that the cylinders of these hypersurfaces are all isomorphic. In particular they have many  $\mathbb{G}_a$ -actions. Consider the cylinder on the hypersurface  $S$  defined by the equation  $x^2 z - y^2 + x = 0$ . We will use explicit examples of  $\mathbb{G}_a$ -actions on the cylinder over  $S_2$  to describe several  $\mathbb{G}_a$ -actions on  $S$  with particular properties. We will also discuss the question of extensions of  $\mathbb{G}_a$ -actions on a hypersurface to  $\mathbb{G}_a$ -actions on the ambient space.