Summary: We prove a generalization of Orlov’s projectivization formula for the derived category $D^b_{coh}(\mathbb{P}(\mathcal{E}))$, where $\mathcal{E}$ does not need to be a vector bundle; Instead, $\mathcal{E}$ is a coherent sheaf which locally admits two-step resolutions. As a special case, this also gives Orlov’s generalized universal hyperplane section formula. As applications, (i) we obtain a blowup formula for blowup along codimension two Cohen-Macaulay subschemes, (ii) we obtain new “flop-flop=twist” results for a large class of flops obtained by crepant resolutions of degeneracy loci. As another consequence, this gives a perverse schober on $\mathbb{C}$. (iii) we give applications of above results to symmetric powers of curves and $\Theta$-flops, following Toda [79].

MSC:

14Fxx (Co)homology theory in algebraic geometry
18Exx Categorical algebra
14Cxx Cycles and subschemes

Keywords:

derived categories; projectivization; flops; determinantal varieties; curves; nested Hilbert schemes

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