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Liouville theorem for surfaces translating by sub-affine-critical powers of Gauss curvature

We construct and classify the translating solutions to the flows by sub-affine-critical powers of the Gauss curvature in $\mathbb{R}^3$. If α denotes the power, this corresponds to a Liouville theorem for degenerate Monge-Ampere equations $\det D^2u = (1+|Du|^2)^{2-\frac{1}{2\alpha}}$ on $\mathbb{R}^2$ for $0 < \alpha < 1/4$. For the affine-critical case $\det D^2u = 1$, a classical result by Jörgens, Calabi and Pogorelov shows the level curves of given solution are homothetic ellipses. In our case, the level curves converge asymptotically to a round circle or a curve with k-fold symmetry for some $3 \leq k \leq n_\alpha$. More precisely, these curves are closed shrinking curves to the $\frac{\alpha}{1-\alpha}$-curve shortening flow that were previously classified by Andrews in 2003. This is a joint work with K. Choi and S. Kim.