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Reduction of Singularities in Poisson Geometry via Weighted Blowups

Hironaka's theorem on resolution of singularities via blowups fails in Poisson geometry, since blowups generally destroy Poisson structures. However, there exists a more general operation called a weighted blowup, which may provide a viable alternative. Weighted blowups have proven useful in the recent literature on resolution of singularities; for instance, in the non-Poisson setting, Abramovich-Temkin-Włodarczyk have shown that fast functorial resolution of singularities can always be achieved by sequentially blowing up the worst singularities via a canonical choice of weighted blowup. We take a similar approach to show that appropriate choices of weighted blowups produce reduction of singularities in low dimensional Poisson geometry. In joint work with Simon Lapointe, Mykola Matviichuk and Brent Pym, we obtain: (1) a criterion for lifting a Poisson structure to a weighted blowup, (2) a classification of normal forms of Poisson varieties not admitting any weighted blowup, in low-dimension, and (3) a theorem on the extent to which weighted blowups can reduce the singularities of Poisson varieties, in low-dimension.