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Prolegomena to singular valuations

Singular valuations of rank \( n > 1 \) are like classical valuations, except that some elements (the singular elements) can have a value with an infinite component (where we view the value group embedded in \( \hat{R}^n \), with \( \hat{R} \) the ordered semi-group of the reals with infinity). Such valuations arise when taking limits of classical valuations. A typical example is given by the total blow-up along a valuation. To a singular valuation, one can associate a valuation ring (which only captures the non-singular part), and a local subring, its "singularization" ring. The properties of the latter are still mysterious. For instance, there can be up to \( 2n \) prime valuation ideals. This work is still in its preliminary stages, and I will mostly present some examples.