Triangular resolutions and effectiveness for holomorphic subelliptic multipliers

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A solution to the effectiveness problem in Kohn's algorithm for generating holomorphic subelliptic multipliers is provided for general classes of domains of finite type in $\mathbb{C}^n$, that include the so-called special domains given by finite and infinite sums of squares of absolute values of holomorphic functions and a more general class of domains recently discovered by Fassina. More generally, for any smoothly bounded pseudoconvex domain we introduce an invariantly defined set S of a holomorphic function germs at each boundary point p, and combined with a result of Fassina, reduce the existence of effective subelliptic estimates at p to a purely algebraic-geometric question of controlling the multiplicity of S. Our main new tool, *a triangular resolution*, is the construction of subelliptic multipliers decomposable as $Q \circ G$, where G is constructed from pre-multipliers and Q is part of a triangular system. The effectiveness is proved via a sequence of newly proposed procedures, called here *meta-procedures*, built on top of the Kohn's procedures, where the order of subellipticity can be effectively tracked. Important sources of inspiration are algebraic-geometric techniques by Y.-T. Siu and procedures for triangular systems by D.W. Catlin and J.P. D'Angelo.