

On the Hilbert function of lines union one non-reduced point

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Abstract. In this paper we consider the problem of determining the Hilbert function of schemes $X \subset \mathbb{P}^n$ which are the generic union of s lines and one m -multiple point. We completely solve this problem for any s and m when $n \geq 4$. When $n = 3$ we find several defective such schemes and conjecture that they are the only ones. We verify this conjecture in several cases.

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