

Some Codimension 3 Artinian O-sequence of Type

$$h_{d-1} > h_d = h_{d+1}$$

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We proved that a graded Artinian O-sequence of codimension 3 with Hilbert function $H = (h_0, h_1, \dots, h_{d-1} > h_d = h_{d+1})$ cannot be level if $h_d \leq 2d + 2$ and that there exists a level O-sequence of codimension 3 of type H for $h_d \geq 2d + 4$ before. Unfortunately, it was unknown if a codimension 3 Artinian O-sequence is level when $h_{d-1} > h_d = h_{d+1} = 2d + 3$. Recently, we solved the final unknown case. In other words, we proved that a codimension 3 Artinian O-sequence such that $h_{d-1} > h_d = h_{d+1} = 2d + 3$ cannot be level. Moreover, since we can construct a graded codimension 3 Artinian level O-sequence of type $h_{d-1} > h_d = h_{d+1} \geq 2d + 4$, we can also produce a graded Artinian O-sequence of codimension $n \geq 4$ with an h -vector $H = (h_0, h_1, \dots, h_{d-1} > h_d = h_{d+1} \geq 2d + (n + 1))$ using the inverse system.