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j-multiplicity

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Let (R, \mathfrak{m}) be a Noetherian local ring with proper ideal I . Define

$$j(I) = \lim_{n \rightarrow \infty} \frac{(d-1)!}{n^{d-1}} \text{length}_R(H_{\mathfrak{m}}^0(I^n/I^{n+1}))$$

and call it the j -multiplicity of I . Here $H_{\mathfrak{m}}^0(\bullet)$ is the 0-th local cohomology functor. When I is \mathfrak{m} -primary, it is same as the Hilbert-Samuel multiplicity $e_I(R)$.