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"Shadows of representations"

Some most important classical categories of representations are associated with certain subalgebras in the Lie algebra: highest weight modules are defined in terms of a triangular decomposition and Harish-Chandra modules are defined in terms of a subalgebra. But until recently it had not been realized that there exists also a nice "inverse procedure". Namely every irreducible weight representation M of a reductive Lie algebra \mathfrak{g} defines a canonical decomposition of \mathfrak{g} into four subalgebras with very nice properties. This is "the shadow of M on \mathfrak{g} ". The shadow carries valuable information about M , for instance it displays the directions in which M is finite-dimensional. The case of $\mathfrak{g}=\mathfrak{sl}(3)$ is already non-trivial and it will be explained in detail.