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Luisa Carini* (lcarini@unime.it). *On the Multiplicity-Free Plethysms $p_2[s_\lambda]$.*

Given two Schur functions $s_\mu(x)$ and $s_\lambda(x)$, where $x = (x_1, x_2, \dots)$ is an infinite sequence of variables, μ and λ are partitions of weight m and n , respectively, the plethysm $s_\mu[s_\lambda(x)]$ is the symmetric function obtained by substituting the monomials of $s_\lambda(x)$ for the variables of $s_\mu(x)$. Littlewood introduced this operation in the context of the representations of the general linear group and showed that for any partition μ of m ,

$$s_\mu[s_\lambda(x)] = \sum_{\gamma \vdash mn} c_{\mu, \lambda}^\gamma s_\gamma(x)$$

where the sum runs over all partitions γ of mn and $c_{\mu, \lambda}^\gamma$ are non negative integers.

The problem of computing the coefficients $c_{\mu, \lambda}^\gamma$ is one of the fundamental open problems in the theory of symmetric functions and has proved to be very difficult. Essentially there are explicit formulas for $c_{\mu, \lambda}^\gamma$ in a few special cases.

Here we will describe all the shapes λ such that the plethysms $p_2[s_\lambda](x)$ of the power symmetric function $p_2(x)$ and the Schur function $s_\lambda(x)$ are multiplicity-free. (Received September 11, 2017)