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The Redmond Formula with Seniority LARRY ZAMICK, ALBERTO ESCUDEROS, Rutgers U. — As we get to heavier nuclei, we find more states with different seniorities and several states of a given seniority. There is a recursion formula by Redmond that relates an $n \to (n+1)$ coefficient of fractional parentage (cfp) to that of $(n-1) \to n$. However, this involves an *overcomplete* set of principal parent (pp) cfp's. For example, for a 3-particle system, we can form basis states $[[12]^{J_0}3]^J$, where J_0 is the pp; we then antisymmetrize and normalize $\Psi[J_0] = N[J_0](1 - P_{12} - P_{13}) \left[[12]^{J_0}3\right]^J$, and form a ppcfp expansion $\Psi[J_0] = \sum_{J_1}[j^2(J_1)j|\}j^3[J_0]J] \left[[12]^{J_1}3\right]^J$. But for, say, $J = j = 9/2$, there are five $\Psi[J_0]$'s, but only two independent wave functions, one with seniority 1 and one with seniority 3. We note that $[j^2(J_0)j|\}j^3[J_0]J] = 1/(3N[J_0])$. We are able then to obtain the following relation between overcomplete ppcfp's and complete orthonormal cfp's: $A = B = C$, where

$$A = (n+1)[j^n(J_0v_0)j|\}j^{n+1}[J_0v_0]J]\ \ [j^n(J_1v_1)j|\}j^{n+1}[J_0v_0]J],$$

$$B = (n+1)\sum_v [j^n(J_0v_0)j|\}j^{n+1}Jv]\ \ [j^n(J_1v_1)j|\}j^{n+1}Jv],$$

$$C = \delta_{J_0J_1}\delta_{v_0v_1} + n(-1)^{J_0+J_1}\sqrt{(2J_0+1)(2J_1+1)}\sum_{v_2J_2} J_2jJ_1JjJ_0\times$$

$$\times[j^{n-1}(J_2v_2)j|\}j^nJ_0v_0]\ \ [j^{n-1}(J_2v_2)j|\}j^nJ_1v_1].$$

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