On a class of strongly regular signed graphs

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Abstract. Let $w_2(i,j)$ denote the difference between the numbers of positive and negative walks of length 2 starting at vertex i and terminating at j of a signed graph $\dot{G}$. Signed graph $\dot{G}$ which is neither homogeneous complete nor totally disconnected is called strongly regular if there exist constants a, b, c such that $w_2(i,j) = a$ for $i \overset{+}{\sim} j$, $w_2(i,j) = b$ for $i \overset{-}{\sim} j$ and $w_2(i,j) = c$ for $i \nsim j$, respectively. In this paper we consider the class of inhomogeneous strongly regular signed graphs satisfying $a \neq -b$, which are either complete or incomplete with $c = \frac{a+b}{2}$. It occurs that such strongly regular signed graphs have some properties that are analogous to those of strongly regular unsigned graphs. For example, contrary to some other strongly regular signed graphs, they have exactly 3 eigenvalues and their net-degree appears as a simple one.

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