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Some Relations Between Choosablity and 2-List Colorable Graphs

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Let G be a graph on a vertex set $V = \{v_1, \ldots, v_n\}$. For $1 \leq i \leq n$, let L_{v_i} be a list of $d_i + 1$ colors of v_i, where d_i is a given integer. Suppose that G has exactly two colorings using these lists, say $a = (a_1, \ldots, a_n)$ and $b = (b_1, \ldots, b_n)$, where a_i and $b_i \in L_{v_i}$. Let f_G be the graph polynomial of G and

$$f_G(a) \prod_{j=1}^{n} \prod_{s \in L_{v_j} \setminus \{b_j\}} (b_j - s) + f_G(b) \prod_{j=1}^{n} \prod_{s \in L_{v_j} \setminus \{a_j\}} (a_j - s) \neq 0.$$

Then G is f-choosable provided that $f(v_i) = d_i + 1$, for $1 \leq i \leq n$. Among other results we show that for any graph G, there exists a list assignment L, such that each list has size 2 and G has exactly two colorings.