Opposite Sides and Corners Bisectors Theories
in Universal Problem Solving Science

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Data processing is commonly based on the least square method (LSM) [1] by Legendre and Gauss practically the unique known one applicable to contradictory problems. Universal mathematics [2-5] discovered a lot of principal LSM defects.

Opposite sides bisectors theory (ASBT) uses coordinate system rotation invariance via data centralization and standardization. In a plane, take a finite overdetermined quantiset [2-5] of n ($n > 2$; $n \in N^+ = \{1, 2, ...\}$) linear equations with their quantities q(i)

$$_{q(i)}(a_jx + b_jy = c_j) \ (j = 1, 2, ... , n) \ (E_i)$$

and 2 unknown variables x and y with real numbers $q(i) > 0$, a_j , b_j , and c_j . If $n = 2m$ (even), then for any $j = 1, 2, ... , m$, consider m disordered sides pairs P_jP_{j+1} and $P_{j+m}P_{j+1+m}$ of sides (edges) of this polygon as its opposite sides. For each pair, determine the set of all the bisectors equidistant from the two straight lines containing these sides and the intersection of the equidistant line(s) with the polygon area. Then determine the bisectors intersections and their weighted center (Figure 1). If $n = 2m + 1$ (odd), then for any $i = 1, 2, ... , 2m + 1$, similarly consider both quasiopposite pairs (P_iP_{i+1} , $P_{i+m}P_{i+m+1}$) and (P_iP_{i+1} , $P_{i+m+1}P_{i+m+2}$).

Opposite corners bisectors theory (OCBT) also rotation-invariant deals with disordered opposite corners pairs (P_j , P_{j+m}) ($j = 1, 2, ... , m$ by $n = 2m$) or both quasiopposite (P_i , P_{i+m}) and (P_i , P_{i+m+1}) ($i = 1, 2, ... , 2m + 1$ by $n = 2m + 1$) and their bisectors intersections. Then determine their weighted center (Figure 2).

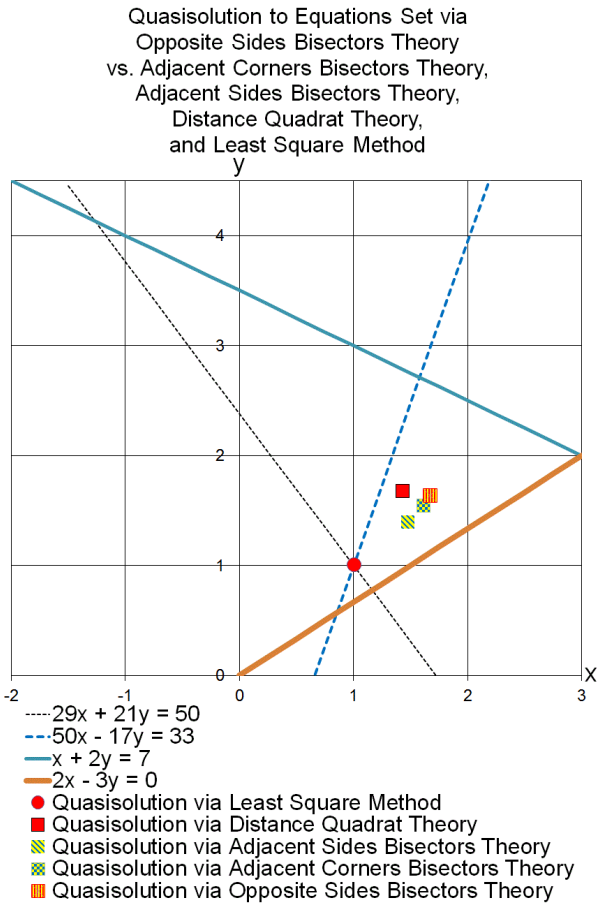

Figure 1. Opposite sides bisectors theory

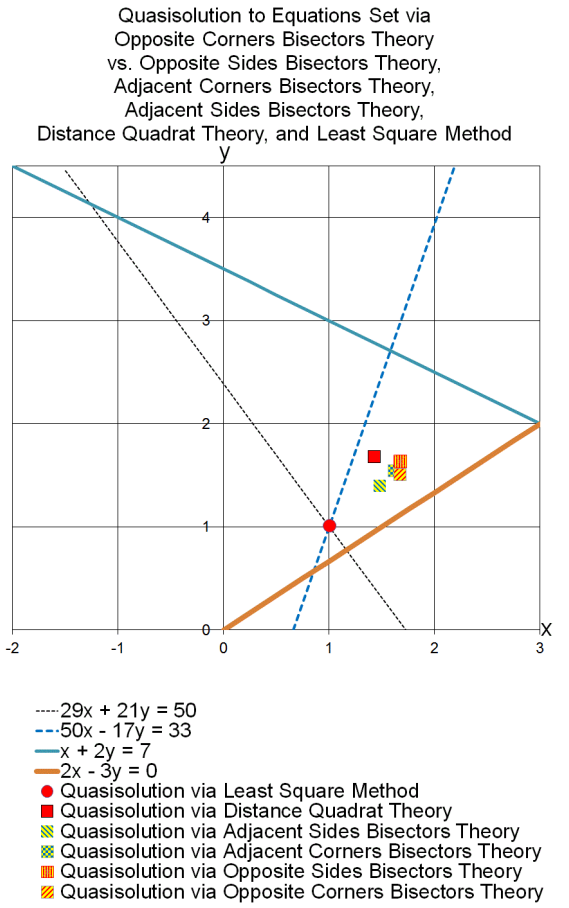

Fig. 2. Opposite corners bisectors theory

Compare applying OSBT, OCBT, adjacent sides bisectors theory (ASBT) with one step only, adjacent corners bisectors theory (ACBT), distance quadrat theory (DQT) [2-4], and the least square method (LSM) to solve this test equation set 29x + 21y = 50, 50x - 17y = 33, x + 2y = 7, 2x - 3y = 0 (see Figures 1, 2). The LSM almost ignores the last two equations with smaller factors (unlike OSBT, OCBT, ASBT, ACBT, DQT). Opposite sides bisectors theory (OSBT) and opposite corners bisectors theory (OCBT) providing simple explicit quasisolutions to even contradictory problems are very efficient by solving many urgent problems, e.g. in aeronautical fatigue.

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