Equidistance and Subjoining Equations Theories in Universal Problem Solving Science
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For data processing, the least square method (LSM) [1] by Legendre and Gauss practically the unique known one applicable to contradictory problems seems to be irreplaceable. Universal mathematics [2-5] discovered: the LSM has principal defects. Equidistance theory (EDT) stepwise excludes equations and then regards them. Determine all the n intersections of the bisectors of the adjacent corners of the linear equation set polygon. For intersection R_i , determine its distance d_i from the polygon side E_i connecting the both corresponding adjacent corners of the polygon, the minimum distance d_{min} , and all the polygon sides providing d_{min}. Move each polygon edge to the interior by d_{min} whereas the initial and the end positions of this polygon side are the opposite sides of the corresponding movement rectangle. Reduce the polygon sides number to obtain a triangle. Determine its incenter. Give it the sum quantity. For each remaining edge, determine the base (with the initial side quantity) of the perpendicular from this center to the straight line including the fixed end position of this initial polygon side. Determine the weighted center of these points. Subjoining equations theory (SJET) also rotation-invariant begins with 3 equations whose straight lines intersections are the corners of a triangle including the given equations polygon and then stepwise subjoins the remaining equations (Figs. 1, 2).
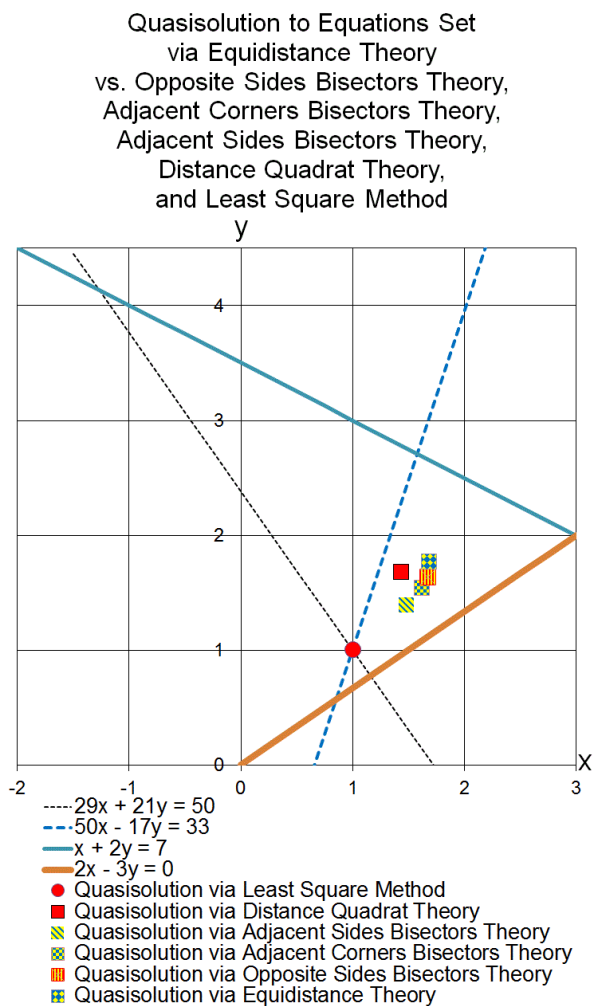
Quasisolution to Equations Set
via Equidistance Theory
vs. Opposite Sides Bisectors Theory,
Adjacent Corners Bisectors Theory,
Adjacent Sides Bisectors Theory,
Distance Quadrat Theory,
and Least Square Method

-----29x + 21y = 50
----50x - 17y = 33
—— x + 2y = 7
—— 2x - 3y = 0
● Quasisolution via Least Square Method
■ Quasisolution via Distance Quadrat Theory
Quasisolution via Adjacent Sides Bisectors Theory
Quasisolution via Adjacent Corners Bisectors Theory
Quasisolution via Opposite Sides Bisectors Theory
Quasisolution via Equidistance Theory

Figure 1. Equidistance theory solution

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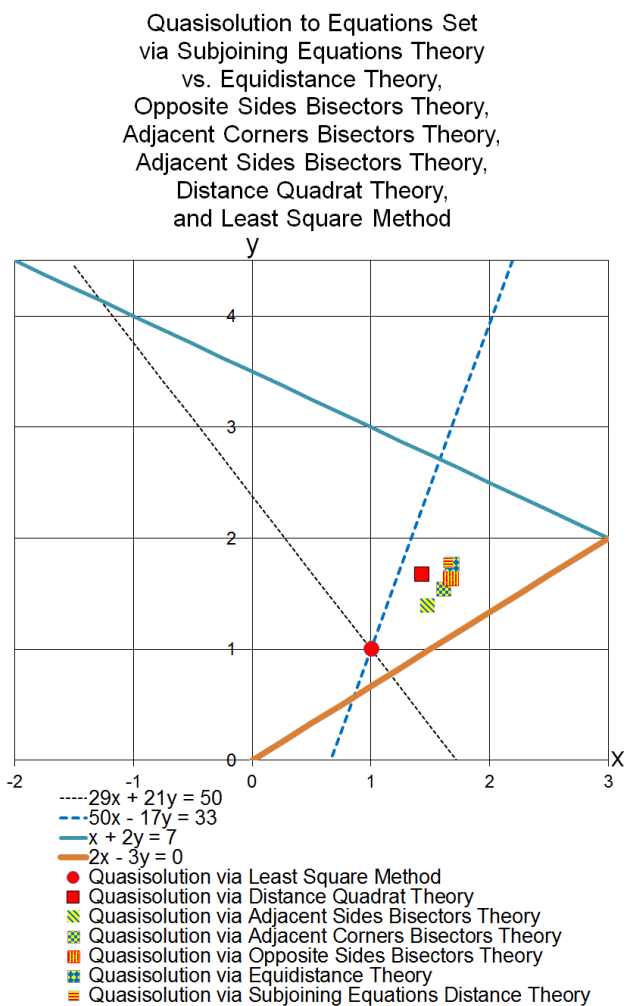Quasisolution via Subjoining Equations Distance Theory

Figure 2. Subjoining equations theory

Compare applying EDT, SJET, opposite sides bisectors theory (OSBT), opposite corners bisectors theory (OCBT), adjacent sides bisectors theory (ASBT), adjacent corners bisectors theory (ACBT) with one step only, distance quadrat theory (DQT) [2-4], and the least square method (LSM) to solving the test equation set $29x + 21y = 50$, $50x - 17y = 33$, $x + 2y = 7$, $2x - 3y = 0$. The LSM ignores the last two equations with smaller factors (unlike EDT, SJET, OSBT, OCBT, ASBT, ACBT, and DQT).

EDT and SJET providing simple explicit quasisolutions to contradictory problems are very efficient by solving many urgent problems, e.g. in aeronautical fatigue.

[1] Encyclopaedia of Mathematics. Ed. Michiel Hazewinkel. Volumes 1 to 10. Supplements I to III. Kluwer Academic Publ., Dordrecht, 1987-2002

[2] Lev Gelimson. General Problem Theory. Abhandlungen der WIGB (Wissenschaftlichen Gesellschaft zu Berlin), 3 (2003), Berlin, 26-32

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[4] Lev Gelimson. Providing Helicopter Fatigue Strength: Flight Conditions. In: Structural Integrity of Advanced Aircraft and Life Extension for Current Fleets – Lessons Learned in 50 Years After the Comet Accidents, Proceedings of the 23rd ICAF Symposium, Claudio Dalle Donne (Ed.), 2005, Hamburg, Vol. II, 405-416

[5] Lev Gelimson. Corrections and Generalizations of the Least Square Method. In: Review of Aeronautical Fatigue Investigations in Germany during the Period May 2007 to April 2009, Ed. Dr. Claudio Dalle Donne, Pascal Vermeer, CTO/IW/MS-2009-076 Technical Report, International Committee on Aeronautical Fatigue, ICAF 2009, EADS Innovation Works Germany, 2009, 59-60