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10. Partial Differential Equations

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On two partial differential and one algebraic systems

In this paper, we establish multivariate analogs of some well-known results concerning the normal system of linear differential equations, the nth order linear differential equation and their connections.

In the multivariate case we deal, correspondingly, with the Pfaff linear system of PDE and some higher order linear system of PDE, introduced here.

For the related Wronskians the corresponding univariate results, including Liouville's formula, are generalized.

Next, the algebraic system, arising from the multivariate characteristic polynomials, is investigated.

We prove that it has maximal number of distinct solutions if and only if some related matrices are commuting and semisimple.

This gives a characterization of correct systems of points for the Lagrange multivariate interpolation.