Piecewise collocation-finite element and Galerkin-finite element methods are proposed and analysed for a nonlinear partial integro-differential equation that arises in the modeling of phase transitions. We compute solutions in both methods using some standard quadrature rules. We present the order of accuracy of such semidiscrete time dependent problem with full integral and quadrature for the Galerkin inner product considering both the real solutions and the approximate solutions are sufficiently smooth in whole domain $\Omega$. We also find an upper bound considering the approximate solutions are $L_2$ in $\Omega$ and $H^s$ in each subdomain $w_i$ such that $\Omega = \cup_i w_i$.

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