



POTENTIAL OPERATORS METHOD OF INTEGRAL SOLUTIONS OF INITIAL VALUE PARABOLIC EQUATIONS

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The presentation will focus on the new iterative method for establishing the existence and uniqueness of solutions to semi-linear initial value parabolic problems of the type

$$u_t - \Delta u = f(u) + F(x, t); x \in \mathbb{R}^n, t > 0 \quad (1)$$

$$u(x, 0) = g(x); x \in \mathbb{R}^n \quad (2)$$

and of the bi-harmonic type

$$u_t = -\lambda \Delta^2 u + v \Delta u^{m+1}; x \in \mathbb{R}^n, t > 0 \quad (3)$$

$$u(x, 0) = f(x); x \in \mathbb{R}^n \quad (4)$$

when the initial data is in \mathcal{L}^p . Much of the talk will center on the investigation of properties of integral solutions to the above problems. In passing, we will also discuss the applications of equations (1) and (2) to modeling cylindrical tumors and equations (3) and (4) to modeling long-range insect dispersals. New directions and open problem will also be presented.