Evolution Biharmonic Equations with $\overrightarrow{p}(x,t)$ Laplacian and Memory Term: Existence, Uniqueness and Blow up

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This talk is concerned with the existence, uniqueness and blow up of the weak solutions for a class of biharmonic equations with memory and $p(x,t)$ Laplacian operator the following type:

$$u_{tt}+\Delta^2 u-\Delta_{\overrightarrow{p}(x,t)}u+\int_0^t g(t-s)\Delta u(s)ds-\Delta u_t+f(u)=0 \text{ in } \ Q_T=\Omega\times(0,T), \tag{1}$$

$$u=\Delta u=0,\ \Gamma_T=\partial\Omega\times(0,T),$$

$$u(x,0)=u_0(x),\ u_t(x,0)=u_1(x),\ x\in\Omega,$$

where Ω is a bounded domain of R^n. Here, $g>0$ is memory Kernel with decays exponentially and $f(u)$ is nonlinear perturbation. The kind of problem, without the memory term, models elastic-plastic flows and its long-time behavior was considered in [3]. In [2], the author studied existence and blow up the weak solution without term memory and the biharmonic operator. Our results generalize the results obtained in [1].

Joint work with Professor Stanislav Antontsev.

References

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[3] **Yang Zhijian., Longtime behavior for a nonlinear wave equation arising in elasto-plastic flow, Math. Appl. Sci. 32 (2009), 1082-1104.**