Existence and uniqueness for a dynamic debonding model in dimension two

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In this talk we present a two-dimensional dynamic debonding model for a thin film, which is assumed to be perfectly flexible and inextensible and initially attached to a flat rigid substrate, when friction is taken into account.

We seek for radial solutions of a weakly damped wave equation to be solved in the debonding domain, which is radially increasing towards the centre of the film. To this aim, we have to propose a suitable version of Griffith's criterion in the planar case.

Two are the main results presented. First, we prove that the wave equation with suitable initial data admits a unique solution when the evolution of the debonding front is prescribed. Secondly, we provide an existence and uniqueness result for the coupled problem given by the wave equation together with Griffith's criterion.

This talk is based on a joint work with Francesco Solombrino and Giuliano Lazzaroni [1].

Keywords: dynamic debonding model, Griffith's criterion, wave equation in time-dependent domains.

References

[1] G. Lazzaroni, R. Molinarolo, F. Solombrino, *Existence and uniqueness for a dynamic debonding model in dimension two*, work in progress.