SECOND ORDER STRICTLY HYPERBOLIC OPERATORS WITH LOW REGULARITY COEFFICIENTS

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In this talk we will consider a second order strictly hyperbolic operator

$$L\,u \;:=\; \partial_t^2 u \;-\; \sum_{j,k=1}^{N} \partial_j\Big(a_{jk}(t,x)\,\partial_k u\Big)$$

defined on a strip $[0,T]\times\mathbb{R}^N$.

It's classical that, if the coefficients a_{jk} are Lipschitz continuous with respect to t, then the Cauchy problem for L is well-posed in $H^1\times L^2$ and (for a_{jk}'s smooth enough) in $H^{s+1}\times H^s$ for all $s\in\mathbb{R}$. This result is based on an energy estimate with *no loss of derivatives* for L.

If the Lipschitz continuity (in time) hypothesis is not fulfilled, then the previous result is no more true. Nevertheless, one can still try to recover the H^∞ well-posedness, with a *finite loss of derivatives* in the energy estimate.

In the present talk we will show some results of this type, under weak regularity assumptions on the a_{jk}'s.