

# UFSCar

## DEPARTAMENTO DE MATEMÁTICA

### COLÓQUIO

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**Falará sobre:**

## **Generalized Energy Conservation for 2 by 2 hyperbolic systems**

**Resumo.** We consider the Cauchy problem for  $2 \times 2$  systems in  $[0, \infty) \times \mathbb{R}$

$$\partial_t U - \lambda(t)A(t)U_x - B(t)U = 0, \quad U(0, x) = U_0(x), \quad (1)$$

by assuming that  $A \in \mathcal{C}^2([0, \infty))$ , and that it is strictly hyperbolic, uniformly up to  $t = \infty$ . Here  $\lambda \in \mathcal{C}^1([0, \infty)) \setminus L^1([0, \infty))$  is a strictly positive *shape function*. Let  $\Lambda(t)$  be a strictly positive primitive of  $\lambda(t)$ . We impose some control on the interaction of the entries of  $A(t)$  and we introduce a classification of the oscillations of  $A(t)$  and  $\lambda(t)$ . If oscillations are fast, we introduce a *stabilization condition*.

We are able to prove *generalized energy conservation*, that is, the solution to (1) satisfies the *a priori* estimate

$$c_1 \|U_0\|_{L^2} \leq \|U(t, \cdot)\|_{L^2} \leq c_2 \|U_0\|_{L^2}, \quad t \geq 0,$$

together with scattering and modified scattering results.

These results are obtained in collaboration with M. Reissig and are collected in:

M. D'Abbicco, M. Reissig. Long time asymptotics for 2 by 2 hyperbolic systems. *J. Differential Equations*, 250, 752–781, 2011.

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