

# Department of Mathematical Sciences Colloquium

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## *Some Applications of the Subdifferential Calculus to Evolution Equations and to Linear Functionals*

We present some of our recent results concerning some applications of the subdifferential calculus to give a new characterization of bounded linear functionals on a Banach space, as well as to study the asymptotic behavior of solutions to some second-order evolution equations of monotone type.

Namely, we show that for a Banach space  $X$ , and  $f : X \rightarrow R$ , we have  $f \in X^*$  if and only if  $f$  is Lipschitz on some open ball  $B(x, \epsilon)$ , and  $f^\circ(y; v) = f(v)$ ,  $\forall y \in B(x, \epsilon)$ ,  $\forall v \in X$ , where  $f^\circ(y; v)$  is the generalized derivative of  $f$  at  $y$ , in the direction  $v$ .

We also study the asymptotic behavior of solutions to the following second-order evolution equation of monotone type in a Hilbert space  $H$  :

$$\begin{cases} p(t)u''(t) + r(t)u'(t) \in Au(t) \text{ a.e. on } R^+ & \text{where } A = \partial\phi, \text{ with } \phi : H \rightarrow \\ u(0) = u_0, \sup_{t \geq 0} |u(t)| < +\infty & \end{cases}$$

$(-\infty, +\infty]$  a proper, convex and lower semicontinuous function on  $H$ .

**Friday, January 18, 2008 at 2 pm in BH 143  
The University of Texas at El Paso**

Please note the unusual time for the Colloquium.
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Refreshments will be served in front of the colloquium room, 15 minutes before the start of the colloquium.

For further information, please contact Dr. Pavel Šolín, Bell Hall 220. Phone: (915) 747-6770, email: [solin@utep.edu](mailto:solin@utep.edu).