Department of Mathematics
City University of Hong Kong

Colloquium

Organised by Prof. F. Cucker and Prof. M. Ismail

On the Pullback Equation

by

Prof. Bernard Dacorogna
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Abstract : We discuss the existence of a diffeomorphism $\varphi : \mathbb{R}^n \to \mathbb{R}^n$ verifying

$$\varphi^*(g) = f$$

where $f, g \in \Lambda^k(\mathbb{R}^n)$, $2 \le k \le n$, are closed differential forms. Componentwise the equation reads as

$$\sum g_{i_1 \dots i_k}(\varphi(x)) d\varphi^{i_1} \wedge \dots \wedge d\varphi^{i_k} = \sum f_{i_1 \dots i_k}(x) dx^{i_1} \wedge \dots \wedge dx^{i_k}.$$

1. Our main result concerns the case $k = 2$. It generalizes the celebrated Darboux theorem in two directions. First we obtain *optimal* regularity in Hölder spaces for the local problem and then, under some necessary additional hypotheses, we get *global* existence as well as regularity. We thus extend to 2-forms the results of Moser and Dacorogna-Moser obtained for the case of volume forms $k = n$.
2. We also obtain local existence for the case $k = n - 1$.
3. Finally we obtain some partial results for the more difficult case $3 \le k \le n - 2$.

Date : 15 February 2011 (Tuesday)
Time : 4:30pm – 5:30pm
Venue : Room B6605 (College Conference Room)
Blue Zone, Level 6
Academic Building
City University of Hong Kong

(Tea, coffee and cookies will be provided at the Faculty Conference Room in B6605 before the colloquium from 4:00 to 4:30pm. Please come and join us.)

**** All interested are welcome ****

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