Seminar: Harmonic Maps, Conservation Laws (and Moving Frames)

Wintersemester 2017/18

Plan

Date	Topic	Literature	Remarks
23.10.	Introduction to harmonic maps and elliptic theory		
30.10.	Conservation laws for harmonic maps 1	[Hél02, Section1.3]	
06.11.	Conservation laws for harmonic maps 2		
13.11.	Sobolev Spaces and the Variational approach	[Hél02, Section 1.4]	
20.11.	S^n-valued maps and the Bäcklund transformation	[Hél02, Section 2.1]	
27.11.	Harmonic maps with values in Lie Groups 1	[Hél02, Section 2.2]	cf. remarks below
04.12.	Harmonic maps with values in Lie Groups 2		dito
11.12.	Weak compactness of harmonic maps with values in the sphere	[Hél02, Section 2.5]	
18.12.	Regularity of harmonic maps with values in the sphere	[Hél02, Section 2.6]	
08.01.	Wente's inequality	[Hél02, Section 3.1]	The proof of Theorem 3.1.7 is not essential
15.01.	Hardy Spaces	[Hél02, Section 3.2]	further details in [Ste93, Chapter III]
22.01.	Lorentz Spaces	[Hél02, Section 3.3]	further details in [EMS70]
29.01.	Wente's inequality refined	[Hél02, Section 3.4]	the last talk should start in this session
05.02.	Regularity weakly stationary maps with values into a sphere	[Hél02, Section 3.5]	

Remarks

1. Instead of the two talks on Lie-Group valued harmonic maps, we could take more time for the last talk. The material for this talk is slightly more than can be covered in one sesseion. Then we would have time to give an outlook on chapter 4 of [Hél02] where the case of harmonic maps into general target is discussed. This is when Moving Frames come into play.

2. Do we have a session on October 30?

References

[EMS70] G. Weiss E. M. Stein. *Introduction to Fourier Analysis on Euclidean Spaces*. Princeton University Press, 1970.

[Hél02] F. Hélein. *Harmonic Maps, Conservation Laws and Moving Frames*. Cambridge University Press, 2002.

[Ste93] E. M. Stein. *Harmonic Analysis: Real-Variable Methods, Orthogonalty, and Oscillatoty Intrgrals*. Princeton University Press, 1993.