On Preiss Differentiability Theorem

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Abstract

The Preiss Differentiability Theorem states that each Lipschitz function on a Fréchet smooth Banach space is somewhere Fréchet differentiable. It is a profound and surprising result that has significantly influenced infinite dimensional calculus since 1990. For example, Borwein-Preiss Variational Principle is a direct offspring of the methods used for its proof. Yet, so many years later a lot about this Theorem is still not fully understood.

This talk provides an account of various attempts by the authors for different and hopefully simplified proofs.