DOCUMENTS MATHÉMATIQUES

SELECTA
YVES MEYER
Volume 2

Edited by A. Bonami, S. Jaffard & S. Seuret



SOCIÉTÉ MATHÉMATIQUE DE FRANCE

SELECTA YVES MEYER
VOLUME 2

Edited by

A. Bonami, S. Jaffard & S. Seuret

Documents Mathématiques

série dirigée par Javier Fresán

Comité de rédaction

Nalini Anantharaman
Mireille Bousquet-Mélou
Françoise Dal'bo
Christophe Eckes
Emmanuel Kowalski

DOCUMENTS MATHÉMATIQUES

Société Mathématique de France
Institut Henri Poincaré, 11, rue Pierre et Marie Curie
75 231 Paris Cedex 05, France

Tél : (33) 01 44 27 67 99 • Fax : (33) 01 40 46 90 96
documents_math@smf.emath.fr • http://smf.emath.fr/

© *Société Mathématique de France 2026*

Tous droits réservés (article L 122–4 du Code de la propriété intellectuelle). Toute représentation ou reproduction intégrale ou partielle faite sans le consentement de l'éditeur est illicite. Cette représentation ou reproduction par quelque procédé que ce soit constituerait une contrefaçon sanctionnée par les articles L 335–2 et suivants du CPI.

ISSN 1629-4939

ISBN 978-2-85629-999-9

Directrice de la publication : Isabelle Gallagher

DOCUMENTS MATHÉMATIQUES 23

SELECTA YVES MEYER VOLUME 2

Edited by

A. Bonami, S. Jaffard & S. Seuret

Société Mathématique de France 2026

TABLE OF CONTENTS

A. Bonami, S. Jaffard & S. Seuret, *Introduction* 1

Acknowledgments and copyrights 3

Chapter 2. Singular Integrals and their Applications

Survey articles

P. Auscher, *Impact of Yves Meyer's work on Kato's conjecture* 7

R. Coifman, *Yves Meyer and nonlinear Fourier Analysis* 31

J. Verdera, *Birth and life of the L^2 boundedness of the Cauchy Integral on Lipschitz graphs* 43

A. Volberg, *From Coifman-Meyer multipliers to several complex variables problems* 81

Original article

R. Coifman & Y. Meyer, *Lavrentiev's curves and conformal mappings* 99

Reprinted articles

Y. Meyer, "Nouvelles estimations pour les opérateurs pseudo-différentiels" 115

R. Coifman & Y. Meyer, "Commutateurs d'intégrales singulières et opérateurs multilinéaires" 121

R. Coifman & Y. Meyer, "Une généralisation du théorème de Calderón sur l'intégrale de Cauchy" 147

Y. Meyer, "Nouvelles estimations pour les solutions d'équations aux dérivées partielles non linéaires" 175

R. Coifman, A. McIntosh & Y. Meyer, "L'intégrale de Cauchy définit un opérateur borné sur L^2 pour les courbes lipschitziennes" 187

R. Coifman, D. G. Deng & Y. Meyer, "Domaine de la racine carrée de certains opérateurs différentiels accrétifs" 215

Y. Meyer, "Intégrales singulières, opérateurs multilinéaires, analyse complexe et équations aux derivées partielles" 227

R. Coifman, Y. Meyer & E. M. Stein, "Some new function spaces and their applications to harmonic analysis" 237

R. Coifman & Y. Meyer, "Nonlinear harmonic analysis and analytic dependence" 269

C. Kenig & Y. Meyer, "Kato's square roots of accretive operators and Cauchy kernels on Lipschitz curves are the same" 277

R. Coifman & Y. Meyer, "A simple proof of a theorem by G. David and J.-L. Journé on singular integral operators" 299

R. Coifman & Y. Meyer, "Nonlinear harmonic analysis, operator theory and partial differential equations" 305

Y. Meyer, "La conjecture de Kato (d'après Pascal Auscher, Steve Hofmann, Michael Lacey, John Lewis, Alan McIntosh et Philippe Tchamitchian)" 349

Chapter 3. Partial Differential Equations

Survey articles

J.-Y. Chemin, *Yves Meyer and pseudo-differential operators* 363

P.-L. Lions, *Yves Meyer and nonlinear Partial Differential Equations: a few memories* 401

F. Planchon, *Partial differential equations, compensation and oscillations* 405

E. Zuazua, *Fourier series and sidewise profile control of* $1-d$ *waves* ... 421

Reprinted articles

Y. Meyer, "Régularité des solutions des équations aux dérivées partielles non linéaires (d'après J.-M. Bony)" 447

G. Bourdaud & Y. Meyer, "Inégalités L^2 précisées pour la classe $S^0_{0,0}$" 457

P. Gerard, Y. Meyer & F. Oru, "Inégalités de Sobolev précisées" 469

A. Cohen, Y. Meyer & F. Oru, "Improved Sobolev embedding theorem" 477

L. Brandolese & Y. Meyer, "On the instantaneous spreading for the Navier-Stokes system in the whole space" 493

Y. Meyer, "Quasicrystals and control theory" 507

Documents mathématiques
23, 2026, p. 1–2

INTRODUCTION

by

Aline Bonami, Stéphane Jaffard & Stéphane Seuret

The aim of this series of three books dedicated to Yves Meyer's works is twofold. The reader will find on the one hand a substantial part of the works of Yves Meyer, and on the other hand texts by other authors that illustrate his evolution and explain the consistency of his work. So first we have collected and reproduced a series of articles by Yves Meyer, which are representative of each of the topics on which he worked. Second, these already published articles are completed by companion texts from other mathematicians, mainly collaborators, but not only. They put into perspective the different subjects he has considered, from the time he first became interested in them to their current situation. They highlight the many breakthroughs he has made and the lasting impact he has had on the subjects.

The present volume contains Chapter 2 and Chapter 3. In the second chapter we gathered part of his achievements on singular operators and their applications, while the next one contains part of his results in Partial Differential Equations (PDE). The papers collected here post-date the start of his collaboration with Raphy Coifman in 1974 around Calderón's programme and most are in collaboration with him. This represents respectively 13 and 6 articles by Yves Meyer that are reproduced in this volume.

The contribution of Joan Verdera is concerned with the boundedness of the Cauchy integral for complex domains, and different proofs and applications, starting from the work of Coifman and Meyer. In parallel, the paper by Pascal Auscher deals with Kato's conjecture, from the fundamental paper of Coifman, Meyer, and McIntosh (which deals with the one variable case) to the most recent developments. Raphy Coifman himself comes back with an original article jointly written with Yves. It deals with the Riemann mapping from a simply connected Lipschitz domain of the complex plane into the unit disc. They proved that this mapping depends in an analytic way of the domain. This is

© Documents mathématiques 23, SMF 2026

a striking result that they obtained in the eighties but remained isolated and unfinished until now. This unpublished paper is complemented by a text of Raphy written especially for this volume. Finally, Alexander Volberg bridges the seminal papers of Coifman and Meyer on multipliers and paraproducts with recent results in a multiparameter context with spectacular applications to complex analysis.

Chapter 3 deals with the contributions of Yves Meyer in PDEs. Even if he did not publish many articles (when compared to the other chapters) in this domain, he had a widespread influence, as witnessed by Pierre-Louis Lions, through seminar talks, informal discussions and supervisions of many students. Fabrice Planchon explains how Yves and his collaborators introduced new strategies leading to fine estimates, for instance for the div-curl lemma. The text by Jean-Yves Chemin is centered around non-smooth pseudo-differential operators as developed by Yves and Raphy Coifman. Enrique Zuazua describes the influence of Yves in control theory and goes further with new results. Finally, Pierre-Louis Lions proposes an article on his collaboration with Yves, in particular around the div-curl lemma and its applications.