AN INTRODUCTION TO BRANCHED TRANSPORT

A. MARCHESE

MAIN REFERENCES

- M. Bernot, V. Caselles, and J.-M. Morel. Optimal transportation networks. Models and theory. Lecture Notes in Mathematics, 1955. Springer, Berlin, 2009.
- L. Simon. Lectures on geometric measure theory, volume 3 of Proceedings of the Centre for Mathematical Analysis. Australian National University, Centre for Mathematical Analysis, Canberra, 1983. vii+272 pp.
- M. Colombo, A. De Rosa, and A. Marchese. Improved stability of optimal traffic paths. Calc. Var. Partial Differential Equations, 57:28, 2018.
- M. Colombo, A. De Rosa, and A. Marchese. Stability for the mailing problem. J. Math. Pures Appl., 128:152-182, 2019.
- Colombo, A. De Rosa, and A. Marchese: On the well-posedness of branched transportation, Comm. Pure Appl. Math. (in press) https://doi.org/10.1002/cpa.21919

ADDITIONAL REFERENCES: OPTIMAL BRANCHED TRANSPORT

- F. Maddalena, S. Solimini, and J.M. Morel. A variational model of irrigation patterns. Interfaces and Free Boundaries, 5:391-416, 2003.
- P. Pegon. On the lagrangian branched transport model and the equivalence with its eulerian formulation. 2016. Topological Optimization and Optimal Transport: In the Applied Sciences. Walter de Gruyter GmbH & Co KG (pp. 281-303).
- Q. Xia. Optimal paths related to transport problems. Commun. Contemp. Math., 5: 251-279, 2003.

ADDITIONAL REFERENCES: GMT

- T. De Pauw and R. Hardt. Size minimization and approximating problems. Calc. Var. Partial Differential Equations, 17(4):405-442, 2003.
- M. Colombo, A. De Rosa, A. Marchese, S. Stuvard. On the lower semicontinuous envelope of functionals defined on polyhedral chains, Nonlinear Anal. 163:201-215 ,2017.

- E. Paolini and E. Stepanov. Decomposition of acyclic normal currents in a metric space. J. Funct. Anal., 263(11):3358-3390, 2012.
- S. K. Smirnov. Decomposition of solenoidal vector charges into elementary solenoids, and the structure of normal one-dimensional flows. Algebra i Analiz, 5:206-238, 1993.
- B. White. The deformation theorem for flat chains. Acta Math., 183(2):255-271, 1999.
- B. White. Rectiability of flat chains. Ann. of Math. (2), 150(1):165-184, 1999.

FURTHER RECOMMENDED READINGS ON BRANCHED TRANSPORT AND RELATED TOPICS

- F. Bethuel. A counterexample to the weak density of smooth maps between manifolds in Sobolev spaces. Invent. math. 219, 507–651, 2020.
- A. Brancolini, G. Buttazzo, and F. Santambrogio. Path functionals over Wasserstein spaces. J. Eur. Math. Soc. (JEMS), 8(3):415-434, 2006.
- A. Brancolini and B. Wirth. General transport problems with branched minimizers as functionals of 1-currents with prescribed boundary. Calc. Var. Partial Differential Equations, 57:82, 2018.
- A. Bressan, M. Palladino, Q. Sun. Variational problems for tree roots and branches. Calc. Var. Partial Differential Equations 59:7, 2020.
- A. Bressan, Q. Sun. On the optimal shape of tree roots and branches. Mathematical Models and Methods in Applied Sciences 28 (14), 2763-280, 2018.
- R. Hardt and T. Riviere, Connecting rational homotopy type singularities, Acta Math., 200(1):15-83, 2008.
- J.-M. Morel and F. Santambrogio. The regularity of optimal irrigation patterns. Arch. Ration. Mech. Anal., 195(2):499-531, 2010.
- P. Pegon, F. Santambrogio, Q. Xia. A Fractal shape optimization problem in branched transport. J.Math. Pures Appl., 123, 244-269, 2019.
- Q. Xia. Interior regularity of optimal transport paths. Calc. Var. Partial Differential Equations, 20:283-299, 2004.