

The origin of the p -Laplacian and A. Missbach

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SUMMARY

We describe the historical process of derivation of the p -Laplace operator from a nonlinear Darcy law and the continuity equation. The story begins with nonlinear flows in channels and ditches. As the nonlinear Darcy law we use the power law discovered by O. Smreker and verified in experiments by A. Missbach for flows through porous media in one space dimension. These results were generalized by S. A. Christianovitch and L. S. Leibenson to porous media in higher space dimensions. We provide a brief description of Missbach's experiments.

Keywords: porous medium, filtration, nonlinear Darcy law, pressure-to-velocity power law, p -Laplacian

AMS Classification: 76S05, 35Q35, 35–03 Historical

References

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