

References

1. G. Albrecht, The Veronese surface revisited. *J. Geom.* **73**, 22–38 (2002)
2. W. Alt, *Lineare Funktionalanalysis* (Springer, New York, 2006)
3. B. Andrews, C. Baker, Mean curvature flow of pinched submanifolds to spheres. *J. Differ. Geom.* **85**(3), 357–396 (2010)
4. C. Bär, *Elementare Differentialgeometrie* (Walter de Gruyter GmbH & Co. KG, Berlin, 2010)
5. J.L. Barbosa, M. do Carmo, On the size of stable minimal surfaces in \mathbb{R}^3 . *Am. J. Math.* **98**, 515–528 (1974)
6. J.L. Barbosa, M. do Carmo, Stability of minimal surfaces and eigenvalues of the Laplacian. *Math. Z.* **173**, 13–28 (1980)
7. H.W. Begehr, *Complex Analytic Methods for Partial Differential Equations* (World Scientific Publishing, River Edge, 1994)
8. M. Bergner, S. Fröhlich, On two-dimensional immersions of prescribed mean curvature in \mathbb{R}^n . *Z. Anal. Anw.* **27**(1), 31–52 (2008)
9. M. Bergner, R. Jakob, Exclusion of boundary branch points for minimal surfaces. *Analysis* **31**, 181–190 (2011)
10. S. Bernstein, Über ein geometrisches Theorem und seine Anwendung auf die partiellen Differentialgleichungen vom elliptischen Typus. *Math. Z.* **26**, 551–558 (1927)
11. L. Bers, Univalent solutions of linear elliptic systems. *Comm. Pure Appl. Math.* **VI**, 513–526 (1953)
12. W. Blaschke, K. Leichtweiss, *Elementare Differentialgeometrie* (Springer, New York, 1973)
13. J. Bourgain, H. Brezis, P. Mironescu, Lifting in Sobolev spaces. *J. Anal. Math.* **80**, 37–86 (2000)
14. H. Brauner, *Differentialgeometrie* (Friedrich Vieweg & Sohn Verlagsgesellschaft mbH, Braunschweig, 1981)
15. H. Brezis, J.M. Coron, Multiple solutions of H -systems and Rellich’s conjecture. *Comm. Pure Appl. Math.* **37**, 149–187 (1984)
16. R. Bryant, A duality theorem for Willmore surfaces. *J. Differ. Geom.* **20**, 23–53 (1984)
17. J.L. Buchanan, A similarity principle for Pascali systems. *Complex Variables* **1**, 155–165 (1983)
18. J.L. Buchanan, R.P. Gilbert, *First Order Elliptic Systems* (Academic, New York, 1983)
19. A. Burchard, L.E. Thomas, On the Cauchy problem for a dynamical Euler’s elastica. *Comm. Part. Differ. Equat.* **28**, 271–300 (2003)
20. H. Cartan, *Differential forms* (Dover publications, Mineola, New York, 2006)
21. B.Y. Chen, *Geometry of Submanifolds* (Marcel Dekker, New York, 1973)
22. B.Y. Chen, in *Riemannian Submanifolds*. Handbook of Differential Geometrie 1 (Elsevier Science B.V., The Netherlands, 1999), pp. 187–418

23. B.Y. Chen, G.D. Ludden, Surfaces with mean curvature vector parallel in the normal bundle. Nagoya Math. J. **47**, 161–167 (1972)
24. S.S. Chern, An elementary proof of the existence of isothermal parameters on a surface. Proc. Am. Math. Soc. **6**(5), 771–782 (1955)
25. M.A. Cheshkova, Evolute surfaces in E^4 . Math. Notes **70**(6), 870–872 (2001)
26. R. Coifman, P.L. Lions, Y. Meyer, S. Semmes, Compensated compactness and Hardy spaces. J. Math. Pures Appl. **9**(3), 247–286 (1993)
27. T.H. Colding, W.P. Minicozzi, *Minimal Surfaces* (Courant Institute of Mathematical Sciences, New York, 1999)
28. R. Courant, *Dirichlet's Principle, Conformal Mappings, and Minimal Surfaces* (Interscience publishing, New York, 1950)
29. R. Courant, D. Hilbert, *Methods of Mathematical Physics 2* (Wiley, New York, 1962)
30. R.C.T. da Costa, Constraints in quantum mechanics. Phys. Rev. **A25**(6), 2893–2900 (1982)
31. A. Dall'Acqua, Uniqueness for the homogeneous Dirichlet Willmore boundary value problem (2012). Ann. Glob. Anal. Geom. DOI: 10.1007/S10455-012-9320-6
32. A. Dall'Acqua, K. Deckelnick, H.-Chr. Grunau, Classical solutions to the Dirichlet problem for Willmore surfaces of revolution. Adv. Calc. Var. **1**, 379–397 (2008)
33. U. Dierkes, Maximum principles for submanifolds of arbitrary codimension and bounded mean curvature. Calc. Var. **22**, 173–184 (2005)
34. U. Dierkes, S. Hildebrandt, F. Sauvigny, *Minimal Surfaces* (Springer, New York, 2010)
35. P.M. Dirac, *Lectures on Quantum Mechanics* (Dover Publications, New York, 2001)
36. M.P. do Carmo, *Riemannian Geometry* (Birkhäuser, Boston, 1992)
37. M. Dobrowolski, *Angewandte Funktionalanalysis* (Springer, New York, 2006)
38. H. Dorn, G. Jorjadze, S. Wuttke, On spacelike and timelike minimal surfaces in AdSn. JHEP **05** (2009) 048. DOI: 10.1088/1126-6708/2009/05/048
39. P. Duren, *Theory of H^p Spaces* (Dover Publications, New York, 2000)
40. P. Duren, *Harmonic Mappings in the Plane* (Cambridge University Press, Cambridge, 2004)
41. K. Ecker, *Regularity Theory for Mean Curvature Flow* (Birkhäuser, Boston, 2004)
42. K. Ecker, G. Huiskens, Interior curvature estimates for hypersurfaces of prescribed mean curvature. Ann. Inst. H. Poincaré Anal. Non Linéaire **6**, 251–260 (1989)
43. L.P. Eisenhart, *Riemannian Geometry* (Princeton University Press, Princeton, 1949)
44. J.-H. Eschenburg, J. Jost, *Differentialgeometrie und Minimalflächen* (Springer, New York, 2007)
45. C. Fefferman, E.M. Stein, H^p spaces of several variables. Acta Math. **129**, 137–193 (1972)
46. S. Fröhlich, Curvature estimates for μ -stable G-minimal surfaces and theorems of Bernstein type. Analysis **22**, 109–130 (2002)
47. S. Fröhlich, Katenoidähnliche Lösungen geometrischer Variationsprobleme (2004). Preprint 2322, FB Mathematik, TU Darmstadt
48. S. Fröhlich, On 2-surfaces in \mathbb{R}^4 and \mathbb{R}^n . in *Proceedings of the 5th Conference of Balkan Society of Geometers*, Mangalia, 2005
49. S. Fröhlich, F. Müller, On critical normal sections for two-dimensional immersions in \mathbb{R}^4 and a Riemann–Hilbert problem. Differ. Geom. Appl. **26**, 508–513 (2008)
50. S. Fröhlich, F. Müller, On critical normal sections for two-dimensional immersions in \mathbb{R}^{n+2} . Calc. Var. **35**, 497–515 (2009)
51. S. Fröhlich, F. Müller, On the existence of normal Coulomb frames for two-dimensional immersions with higher codimension. Analysis **31**, 221–236 (2011)
52. S. Fröhlich, S. Winklmann, Curvature estimates for graphs with prescribed mean curvature and flat normal bundle. Manuscripta Math. **122**(2), 149–162 (2007)
53. D. Gilbarg, N.S. Trudinger, *Elliptic Partial Differential Equations of Second Order* (Springer, New York, 1983)
54. K. Große-Brauckmann, R. Kusner, J. Sullivan, Coplanar constant mean curvature surfaces. Comm. Anal. Geom. **5**, 985–1023 (2007)
55. I.V. Guadalupe, L. Rodríguez, Normal curvature of surfaces in space forms. Pac. J. Math. **106**(1), 95–103 (1983)

56. R. Gulliver, in *Minimal Surfaces of Finite Index in Manifolds of Positive Scalar Curvature*, ed. by S. Hildebrandt, D. Kinderlehrer, M. Miranda. Calculus of Variations and Partial Differential Equations (Springer, New York, 1988)
57. R.R. Hall, On an inequality of E. Heinz. *J. Anal. Math.* **42**, 185–198 (1982)
58. P. Hartman, A. Wintner, On the existence of Riemannian manifolds which cannot carry non-constant analytic or harmonic functions in the small. *Am. J. Math.* **75**, 260–276 (1953)
59. P. Hartman, A. Wintner, On the local behaviour of solutions of nonparabolic partial differential equations. *Am. J. Math.* **75**, 449–476 (1953)
60. E. Heil, *Differentialformen und Anwendungen auf Vektoranalysis, Differentialgleichungen, Geometrie* (Bibliographisches Institut, Germany, 1974)
61. E. Heinz, Über die Lösungen der Minimalflächengleichung. *Nachr. Akad. Gött., Math.-Phys. Kl.*, 51–56 (1952)
62. E. Heinz, On certain nonlinear elliptic differential equations and univalent mappings. *J. Anal. Math.* **5**, 197–272 (1957)
63. E. Heinz, Über das Randverhalten quasilinearer elliptischer Systeme mit isothermen Parametern. *Math. Z.* **113**, 99–105 (1970)
64. F. Helein, *Harmonic Maps, Conservation Laws and Moving Frames* (Cambridge University Press, Cambridge, 2002)
65. W. Helfrich, Elastic properties of lipid bilayers: Theory and possible experiments. *Z. Naturforsch.* **28c**, 693–703 (1973)
66. S. Hildebrandt, Einige Bemerkungen über Flächen beschränkter mittlerer Krümmung. *Math. Z.* **115**, 169–178 (1970)
67. S. Hildebrandt, H. von der Mosel, On Lichtenstein's theorem about globally conformal mappings. *Calc. Var.* **23**, 415–424 (2005)
68. S. Hildebrandt, J. Jost, K.O. Widman, Harmonic mappings and minimal submanifolds. *Invent. Math.* **62**, 269–298 (1980)
69. D. Hoffman, R. Osserman, *The Geometry of the Generalized Gauss Map* (American Mathematical Society, Providence, 1980)
70. E. Hopf, Bemerkungen zu einem Satze von S. Bernstein aus der Theorie der elliptischen Differentialgleichungen. *Math. Z.* **29**, 744–745 (1929)
71. E. Hopf, On S. Bernstein's theorem on surfaces $z(x, y)$ of nonpositive curvature. *Proc. Am. Math. Soc.* **1**(1), 80–85 (1950)
72. H. Hopf, Über Flächen mit einer Relation zwischen den Hauptkrümmungen. *Math. Nachr.* **4**, 232–249 (1950/51)
73. R. Jakob, Finiteness of the set of solutions of Plateau's problem for polygonal boundary curves. *Ann. I.H. Poincaré Anal. Non Linéaire* **24**, 963–987 (2007)
74. R. Jakob, About the finiteness of the set of solutions of Plateau's problem for polygonal boundary curves. *Analysis* **29**, 365–385 (2009)
75. R. Jakob, Finiteness of the number of solutions of Plateau's problem for polygonal boundary curves II. *Ann. Global Anal. Geom.* **36**, 19–35 (2009)
76. J. Jost, Y.L. Xin, Bernstein type theorems for higher codimension. *Calc. Var.* **9**, 277–296 (1999)
77. H. Kalf, T. Kriecherbauer, E. Wienholtz, *Elliptische Differentialgleichungen Zweiter Ordnung* (Springer, New York, 2009)
78. K. Kenmotsu, *Surfaces of Constant Mean Curvature* (Oxford University Press, Oxford, 2003)
79. K. Kenmotsu, D. Zhou, The classification of the surfaces with parallel mean curvature vector in two-dimensional complex space forms. *Am. J. Math.* **122**, 295–317 (2000)
80. W. Klingenberg, *Eine Vorlesung über Differentialgeometrie* (Springer, New York, 1973)
81. K. Kobayashi, Fundamental equations for submanifolds. *Fortschr. Phys.* **37**, 599–610 (1989)
82. B.G. Konopelchenko, G. Landolfi, On rigid string instantons in four dimensions. *Phys. Lett.* **B459**, 522–526 (1999)
83. A. Korn, in *Zwei Anwendungen der Methode der sukzessiven Approximation*. Mathematische Abhandlungen Hermann Amandus Schwarz zu seinem fünfzigjährigem Doktorjubiläum am 6. August 1914 gewidmet von Freunden und Schülern (Springer, New York, 1914), pp. 215–229

84. W. Kühnel, *Differentialgeometrie* (Friedrich Vieweg & Sohn Verlagsgesellschaft mbH, Braunschweig, 1999)
85. H.B. Lawson, Complete minimal surfaces in S^3 . *Ann. Math.* **92**, 335–374 (1970)
86. H. Li, Willmore surfaces in S^n . *Ann. Glob. Anal. Geom.* **21**, 203–213 (2002)
87. L. Lichtenstein, Zur Theorie der konformen Abbildung. Konforme Abbildung nichtanalytischer, singularitätenfreier Flächenstücke auf ebene Gebiete. *Bull. Int. de l'Acad. Sci. Cracovie A*, 192–217 (1916)
88. M.J. Micallef, Stable minimal surfaces in Euclidean space. *J. Differ. Geom.* **19**, 57–84 (1984)
89. R. Moser, *Partial Regularity, Harmonic Maps and Related Problems* (World Scientific Publishing, River Edge, 2005)
90. F. Müller, Funktionentheorie und Minimalflächen. Lecture notes, University Duisburg (2011)
91. F. Müller, A. Schikorra, Boundary regularity via Uhlenbeck-Rivière decomposition. *Analysis* **29**(2), 199–220 (2009)
92. J.C.C. Nitsche, *Vorlesungen über Minimalflächen* (Springer, New York, 1975)
93. R. Osserman, Global properties of minimal surfaces in \mathbb{R}^3 and \mathbb{R}^n . *Ann. Math.* **80**(2), 340–364 (1964)
94. R. Osserman, *A Survey of Minimal Surfaces* (Dover Publications, New York, 1986)
95. B. Palmer, Uniqueness theorems for Willmore surfaces with fixed and free boundaries. *Indiana Univ. Math. J.* **49**, 1581–1601 (2000)
96. M. Pinl, Abwickelbare Schieblflächen in R_n . *Comm. Math. Helv.* **24**, 64–67 (1950)
97. M. Pinl, B-Kugelbilder reeller Minimalflächen in R_4 . *Math. Z.* **59**, 290–295 (1953)
98. T. Rivière, Conservation laws for conformally invariant variational problems. *Invent. Math.* **168**, 1–22 (2007)
99. T. Rivière, Analysis aspects of Willmore surfaces. *Invent. math.* **174**, 1–45 (2008)
100. H. Ruchert, Ein Eindeutigkeitssatz für Flächen konstanter mittlerer Krümmung. *Arch. math.* **33**, 91–104 (1979)
101. K. Sakamoto, Variational problems of normal curvature tensor and concircular scalar fields. *Tohoku Math. J.* **55**, 207–254 (2003)
102. F. Sauvigny, Die zweite Variation von Minimalflächen im \mathbb{R}^p mit polygonalem Rand. *Math. Z.* **189**, 167–184 (1985)
103. F. Sauvigny, Ein Eindeutigkeitssatz für Minimalflächen im \mathbb{R}^p mit polygonalem Rand. *J. Reine Angew. Math.* **358**, 92–96 (1985)
104. F. Sauvigny, On the Morse index of minimal surfaces in \mathbb{R}^p with polygonal boundaries. *Manuscripta Math.* **53**, 167–197 (1985)
105. F. Sauvigny, A-priori-Abschätzungen der Hauptkrümmungen für Immersionen vom Mittleren-Krümmungs-Typ mittels Uniformisierung und Sätze vom Bernstein-Typ. Habilitationsschrift, Göttingen (1988)
106. F. Sauvigny, On immersions of constant mean curvature: Compactness results and finiteness theorems for Plateau's problem. *Arch. Rat. Mech. Anal.* **110**, 125–140 (1990)
107. F. Sauvigny, *Partielle Differentialgleichungen der Geometrie und Physik* (Springer, New York, 2005)
108. R. Schätzle, The Willmore boundary value problem. *Calc. Var.* **37**, 275–302 (2010)
109. R. Schoen, L. Simon, S.T. Yau, Curvature estimates for minimal hypersurfaces. *Acta Math.* **134**, 275–288 (1975)
110. J.A. Schouten, *Ricci Calculus* (Springer, New York, 1954)
111. F. Schulz, *Regularity Theory for Quasilinear Elliptic Systems and Monge-Ampère Equations in Two Dimensions* (Springer, New York, 1991)
112. B. Sharp, P. Topping, Decay estimates for Rivière's equation, with applications to regularity and compactness. *Trans. Am. Math. Soc.* (to appear)
113. K. Smoczyk, G. Wang, Y.L. Xin, Bernstein type theorems with flat normal bundle. *Calc. Var.* **26**, 57–67 (2006)
114. E.M. Stein, *Harmonic Analysis: Real-Variable Methods, Orthogonality, and Oscillatory Integrals* (Princeton University Press, Princeton, 1993)

- 115. F. Tomi, Ein einfacher Beweis eines Regularitätssatzes für schwache Lösungen gewisser elliptischer Systeme. *Math. Z.* **112**, 214–218 (1969)
- 116. P. Topping, The optimal constant in Wente's L^∞ -estimate. *Comment. Math. Helv.* **72**, 316–328 (1997)
- 117. I.N. Vekua, *Verallgemeinerte Analytische Funktionen* (Akademie, Berlin, 1963)
- 118. A. Voss, Zur Theorie der Transformation quadratischer Differentialausdrücke und der Krümmung höherer Mannigfaltigkeiten. *Math. Ann.* **16**, 129–179 (1880)
- 119. M.-T. Wang, On graphic Bernstein type results in higher codimension. *Trans. Am. Math. Soc.* **355**, 265–271 (2003)
- 120. J.L. Weiner, On a problem of Chen, Willmore, et al. *Indiana Univ. Math. J.* **27**(1), 19–35 (1978)
- 121. W.L. Wendland, *Elliptic Systems in the Plane* (Pitman Publishing, London, 1979)
- 122. H.C. Wente, The differential equation $\Delta x = 2H x_u \wedge x_v$ with vanishing boundary values. *Proc. Am. Math. Soc.* **50**, 131–137 (1975)
- 123. H.C. Wente, Large solutions to the volume constrained Plateau problem. *Arch. Rat. Mech. Anal.* **75**, 59–77 (1980)
- 124. H. Weyl, Zur Infinitesimalgeometrie: p -dimensionale Fläche im n -dimensionalen Raum. *Math. Z.* **12**, 154–160 (1922)
- 125. T.J. Willmore, *Riemannian Geometry* (Oxford Science Publications, Clarendon Press, Oxford, 1993)
- 126. W. Wirtinger, Eine Determinantenidentität und ihre Anwendung auf analytische Gebilde und Hermitesche Massbestimmung. *Monatsh. Math. Phys.* **44**, 343–365 (1936)
- 127. Y.L. Xin, Curvature estimates for submanifolds with prescribed Gauss image and mean curvature. *Calc. Var.* **37**, 385–405 (2010)
- 128. B. Zwiebach, *A First Course in String Theory* (Cambridge University Press, Cambridge, 2004)

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