



The family index theorem and bifurcation of solutions of nonlinear elliptic bvp

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(Submitted on 8 Jul 2011 (v1), last revised 30 Jan 2012 (this version, v3))

We obtain some new bifurcation criteria for solutions of general boundary value problems for nonlinear elliptic systems of partial differential equations. The results are of different nature from the ones that can be obtained via the traditional Lyapunov-Schmidt reduction. Our sufficient conditions for bifurcation are derived from the Atiyah-Singer family index theorem and therefore they depend only on the coefficients of derivatives of leading order of the linearized differential operators. They are computed explicitly from the coefficients without the need of solving the linearized equations. Moreover, they are stable under lower order perturbations.

Comments: 20 pages, Corrections in sections 2,4 and references. Added Section 5 (example) and an Appendix. To appear on JDE

Subjects: **Analysis of PDEs (math.AP)**; Functional Analysis (math.FA)

MSC classes: 58E07, 58J55 (Primary) 58J20, 35J55, 55N15, 47A53, 58J32 (Secondary)

Cite as: [arXiv:1107.1727](#) [math.AP]

(or [arXiv:1107.1727v3](#) [math.AP] for this version)

Submission history

From: Jacobo Pejsachowicz [[view email](#)]

[v1] Fri, 8 Jul 2011 20:22:17 GMT (21kb)

[v2] Tue, 25 Oct 2011 19:56:55 GMT (27kb)

[v3] Mon, 30 Jan 2012 15:43:10 GMT (27kb)

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