(a)

(b)

(c)

w_{MP}

(a) $\ldots V(\lambda) = F_\lambda(w_{\mathrm{MP}}) \approx 4.84$
(b) $\ldots F_\lambda(w) \approx -15.57$
(c) $\ldots F_\lambda(w) \approx -5.5 \cdot 10^4$

Professor Jiri Horak
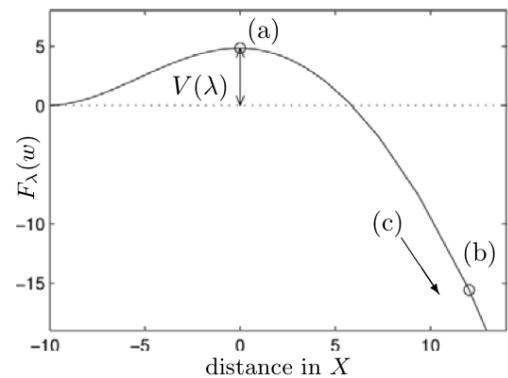
From: J. Horak, G. J. Lord, M. A. Peletier, "Cylinder buckling: the mountain pass as an organizing center", SIAM J. Appl. Math. Vol. 66 No. 5, 2006, pp. 1793-1824

See:
http://www.mi.uni-koeln.de/~jhorak/
http://65.54.113.26/Author/53419011/jiri-horak

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Personal Biography:
I was born and grew up in the town of Pardubice in the Czech Republic (then Czechoslovakia). My favorite place in my country lies not far from there, about 80 kilometers (50 miles) to the north on the border with Poland. It is a range of mountains and a national park called Krkonose. It is distinguished by its natural beauty and also offers a lot of hiking trails. In winter, there is a wide variety of trails for cross country skiing, as well as slopes for downhill skiing. Mountaineering is one of my hobbies. Besides the regular hikes in the mountains in the Czech Republic and Slovakia, I had an opportunity to make a great number of hikes in Ireland, mostly in the southern part of the island - in county Kerry. There are also some old pictures of hikes in the French Alps and the Joshua Tree National Park in California. Switzerland is a paradise for outdoor sports. Besides hiking and skiing I also fell in love with mountain biking. The Jura mountains have some really nice trails.

Career:

October 2003 - September 2008, since April 2009: University of Cologne, Germany, Department of Mathematics: postdoc assistant in the group of Prof. Bernd Kawohl

October 2008 - March 2009: RWTH Aachen University, Germany, substitute professor at the Department of Mathematics

October 2001 - September 2003 University of Basel, Switzerland, Department of Mathematics: postdoc in the group of Prof. Catherine Bandle

August 1996 - December 1998, August 2000 - August 2001 University of Connecticut, USA, Department of Mathematics, PhD degree (advisor: Prof. Joe McKenna), August 2001; Master's degree, May 1998; teaching assistant

January - June 2000: University College Cork, Ireland, Department of Applied Mathematics: research/teaching assistant

Research Interests:
Nonlinear partial differential equations, Calculus of variations, Numerical methods for partial differential equations. Problems I have been working on include: Constrained Mountain Pass Algorithm (a numerical method which approximates critical points of a functional under constraints), traveling waves in a suspension bridge or a nonlinearly supported plane, the Fucik spectrum of the Laplace operator, buckling of a thin cylinder, numerical solution of Euler and Navier-Stokes equations.

Selected publications:
J. Horak, G. J. Lord, M. A. Peletier, Numerical variational methods applied to cylinder buckling, SIAM J. Sci. Comput. 30 (2008), no. 3, 1362-1386.

J. Horak, G. J. Lord, M. A. Peletier, Cylinder buckling: the mountain pass as an organizing center, SIAM J. Appl. Math. 66 (2006), no. 5, 1793-1824.
ABSTRACT: We revisit the classical problem of the buckling of a long thin axially compressed cylindrical shell. By examining the energy landscape of the perfect cylinder we deduce an estimate of the sensitivity of the shell to imperfections. Key to obtaining this is the existence of a mountain pass point for the system. We prove the existence on bounded domains of such solutions for all most all loads and then numerically compute example mountain pass solutions. Numerically the mountain pass solution with lowest energy has the form of a single dimple. We interpret these results and validate the lower bound against some experimental results available in the literature.

B. Breuer, J. Horak, P. J. McKenna, M. Plum, A computer-assisted existence and multiplicity proof for travelling waves in a nonlinearly supported beam, J. of Differential Equations 224 (2006), no. 1, 60-97.

J. Horak, Constrained mountain pass algorithm for the numerical solution of semilinear elliptic problems, Numerische Mathematik 98 (2004) 251-276

R. F. Bass, J. Horak, P. J. McKenna, On the lift-off constant for elastically supported plates, Proc. Amer. Math. Soc. 132 (2004), no. 10, 2951-2958.

J. Horak, P. J. McKenna, Traveling waves in nonlinearly supported beams and plates, Nonlinear Equations: Methods, Models and Applications, Progress in Nonlin. Diff. Eq. Appl., vol. 54, Birkhäuser, Basel 2003, 197-215.