CV. THE VARIATIONAL RATIONALITY PROJECT. RELATED PUBLICATIONS

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1 Personal situation

Antoine Soubeyran, Professor Emeritus, from 2012 to now. Aix-Marseille University.

Member of AMSE, member of GREQAM.

Old topics. International Economics. Environmental Economics. Industrial Economics.

More recent topics. Behavioral Sciences, Optimization theory, Variational principles and Algorithms, Contract theory.

I still continue to work actively on two main topics,

1) In Behavioral Sciences and Optimization theory. The variational rationality project. See below.

2) In Economics. Value creation and value appropriation processes (contract theory, moral hazard, adverse selection), including two papers,

- Long, N.Van., Soubeyran, A., & Soubeyran, R.(2014). Knowledge accumulation within an organization. International Economic Review, 55(4), 1089-1128. Rank A.

- Querou, N., Soubeyran, A., & Soubeyran, R.(2016). Motivating versus funding. Submitted to Review of Economic Studies.

Several co-authors visited me from 2012 to now, including Boris Mordukhovich (three weeks), Glaydston de Carvalho Bento (one year, and two other short visits, one week each), Joao Xavier da Cruz Neto, (two short visits, one week each visit, Joao Carlos Souza (one month), Valdines Leite de Sousa (one year), Bao Truong Q (two visits, three weaks each), ...

2 The scientific project. Variational rationality.

THE SCIENTIFIC PROJECT

This project started in 2004. We wanted to build a general model of human stay and change approach-avoidance behavioral dynamics as a system of tensions (satisfactions, unsatisfactions) where agents try to approach desired ends

and avoid undesired current positions. Our scientifc project is highly inter disciplinary. It offers a unifying view of different aspects of the dynamics of human behaviors which appear in a very dispersed way in Psychology, Economics, Management Sciences, Game theory, Political Sciences, Artificial Intelligence, Sociology, and Applied Mathematics (Optimization, Variational Aalysis).

We give below the list of papers that we have published since 2006, as applications of our variational rationality approach. This list shows, at our great surprise, that most of (famous) variational principles and algorithms in Optimization theory and Variational Analysis rest on our variational rationality principles for human behaviors. See Soubeyran (2009, 2010, 2016) in our list of Pre prints.

THE IDEA. TENSION SYSTEMS

Our project is in line with the Force field theory of the famous psychologist Kurt Lewin (1951), an alter ego of Freud, who described human states of mind and activities as a system of tensions. " So life is a constant interplay between completing old situations and opening up new ones. If we're alive and well, there's always excitement, tension, possibilities. You can get closure and reduce tension, but the tension is never eliminated because we keep our systems open to be able to explore new events, people, and possibilities". Later, a second principle in Murray's system, involves the idea of tension reduction and tension production. Murray agreed with Freud and other theorists that people act to reduce physiological and psychological tension, but this does not mean we strive for a tension-free state. It is the process of acting to reduce tension that is satisfying, according to Murray, rather than the attainment of a condition free of all tension. Murray believed that a tension-free existence is itself a source of distress. We need excitement, activity, and movement, all of which involve increasing, not decreasing, tension. We generate tension in order to have the satisfaction of reducing it. Murray believed the ideal state of human nature involves always having a certain level of tension to reduce. Later, A Bandura, the founder of the modern self regulation theory, examines how agents self regulate their activities through discrepancy reduction and discrepancy production. Bandura famous Social cognitive theory posits proactive discrepancy production by adoption of goal challenges working in concert with reactive discrepancy reduction in realizing them.

OUR APPROACH. HUMANS ARE VARIATIONALLY RATIONAL

Things are very complicated because desired ends and undesirable current positions are moving and ambivalent, having each attractive and repulsive aspects which can change as time evolves. Some agents are initially satisfied, being where they wanted to be. If they are passive, they will prefer to stay there. If they are pro-active, they will set new challenges where they want to be. Other agents feel initially unsatisfied, not being where they want to be. They want to move to reduce their tensions (feelings generated by the discrepancies between where they are and where they want to be), either to approach a desired fixed or moving end or to avoid an undesirable current position. Then, human dynamics is a system of transitions, both discrepancy reductions (striving to reach goals)

and discrepancy productions (setting new goals) in order to reach old and new desires. We argue and modelize the facts that,

- agents consider differences, discrepancies, gaps, and beliefs. They either stay or change.

- to form their intentions to change or to stay, agents focus their attention on focal states (where they want to be), and consider their related behavioral chains, an upstream chain of capabilities (means and know how, to know how to use these means), and a downstream chain of ends (outcomes, payoffs, utilities, aspirations and desires),

- to chose what to do (where to be, what to have) agents construct their preferences in an adaptive way. They depend on environments, experience, contexts, several variable reference points (statu quo, goals, ideal points,....), and beliefs (self efficacy beliefs, outcome beliefs, ...),

- agents balance, each period, between their motivation and resistance to change. They will change if it is worthwhile to change, that is when their motivation to change is higher enough with respect to their resistance to change, and stay in the opposite case. Motivation is defined as the utility of advantages to change, and resistance is defined as the disutility of inconveniences to change,

- advantages to change are the difference between payoffs to change and to stay,

- inconveniences to change are the difference between capability costs, costs of being able to change and costs of being able to stay,

- starting from current undesirable positions, agents cannot reach their desired ends (fixed or moving desires) in one step. They are obliged to follow transitions,

- transitions, that is successions of stays and changes, must be acceptable. This requires that, each period, satisfactions (motivations) must be higher enough with respect to sacrifices (resistances). This means that transitions must be worthwile,

- before being able to reach their desired ends, agents can fall in traps, worthwhile to reach, but not worthwhile to leave.

The problem is to know when agents can reach their desires, or fall in traps before. This, at the individual, group or interrelated agents (game) levels.

3 Co-authors

This project has been developped in more than 30 articles published (two are in revision) in Top Journals in Mathematics and Economics (4 rank A*, 22 rank A, 4 rank B).

We worked with a lot of different co-authors in this direction. Two are very famous: Boris Mordukhovich is a world star in Applied Mathematics. He is one of the four founders of the modern Variational Analysis. The other is Hedy Attouch.

The list of my co authors is: Attouch,H., Martinez Legaz, J.E, Redont, P, Bolte, J, Cruz Neto, J.X., Oliveira, P.R., Souza, S.D.S, Luc, D.T., Sarabi, E,

Moreno, F, Flores Bazan, F, Soares, Jr.P, Flåm, S.D., Godal, O, Villacorta, K.D.V, Bento, G.C, Long, N.Van, Soubeyran, R, Bao, T. Q, Mordukhovich, B. S, Souza, J.C, Lopes, J, Khanh, P, Cobzas, S, Sousa, V.

4 Publications related to the Variational rationality project

1) Attouch,H., & Soubeyran, A.(2006). A cognitive approach of the Ekeland theorem, section 3.4. In. Variational Analysis in Sobolev and BV Spaces: Applications to PDE and Optimization., Editors H. Attouch - G. But- tazzo - G. Michaille, MPS-SIAM series on Optimization, MP06.

2) Attouch, H., & Soubeyran, A. (2006). Inertia and reactivity in decision making as cognitive variational inequalities. Journal of Convex Analysis, 13(2), 207- 224. Rank A.

3) Martinez Legaz, J.E., & Soubeyran, A. (2007). A Tabu search scheme for abstract problems, with applications to the computation of fixed points. Journal of Mathematical Analysis and Applications, 338(1), 620-627. Rank A.

4) Attouch, H., Redont, P., & Soubeyran, A. (2007). A New class of alternating proximal minimization algorithms with costs- to- move. SIAM Journal on Optimization, 18(3), 1061-1081. Rank A*.

5) Attouch, H., Bolte, J., Redont, P., & Soubeyran, A.(2008). Alternating proximal algorithms for weakly coupled convex minimization problems. Applications to dynamical games and PDE.s. Journal of Convex Analysis,15 (3), 485. 506. Rank A.

6) Cruz Neto, J.X., Oliveira, P.R., Souza, S.D.S., & Soubeyran, A. (2010). A Proximal algorithm with separable Bregman distances for quasiconvex optimization over the nonnegative orthant. European Journal of Operation Research. Vol. 201, Issue 2, 365-376. Rank A*.

7) Luc, D.T., Sarabi, E., & Soubeyran, A. (2010). Existence of solutions in variational relations problems without convexity. Journal of Mathematical Analysis and Applications 364(2), 544-555. Rank A.

8) Attouch, H., Bolte, J., Redont, P., & Soubeyran, A.(2010). Proximal alternating minimization and projection methods for nonconvex problems. An approach based on the Kurdyka- Lojasiewicz inequality. Mathematics of Operations Research, 35(2), 438-457. Rank A*.

9) Attouch,H., & Soubeyran, A. (2010). Local search proximal algorithms as decision dynamics with costs to move. Set-Valued and Variational Analysis, 19(1), 157-177. Rank A.

10) Moreno, F., Oliveira, P.R., & Soubeyran, A. (2012). A proximal algorithm with quasi distance. Application to habit formation. Optimization, 61(12), 1383-1403. Rank B.

11) Flores Bazan, F., Luc, D.T., & Soubeyran, A. (2012). Maximal elements under reference-dependent preferences with applications to behavioral traps and games. Journal of Optimization Theory and Applications, 155(3), 883-901.

Rank A.

12) Luc, D.T., & Soubeyran, A. (2013). Variable preference relations: Existence of maximal elements. Journal of Mathematical Economics, 49(4), 251-262. Rank A.

13) Cruz Neto, J.X., Oliveira, P.R., Soares, Jr.P., & Soubeyran, A. (2013). Learning how to play Nash, potential games and alternating minimization method for structured non convex problems on Riemannian manifolds. Journal of Convex Analysis, 20(2), 395-438. Rank A.

14) Cruz Neto, J.X., Oliveira, P.R., Soares; Jr.P., & Soubeyran,.A. (2013). Proximal point method on Finslerian manifolds and the "effort.accuracy" tradeoff. Journal of Optimization Theory and Applications, 162(3), 873-891. Rank A.

15) Flåm, S.D., Godal, O., & Soubeyran.A. (2014). Gradient differences and bilateral barters. Optimization, 63(5), 693-712. Rank B.

16) Villacorta, K.D.V., Oliveira, P.R., & Soubeyran, A. (2014). A trust-region method for unconstrained multiobjective problems with applications in satisficing processes. Journal of Optimization Theory and Applications,160(3), 865-889. Rank A.

17) Bento, G.C., Cruz Neto, J.X., Oliveira, P.R., & Soubeyran, A. (2014).The self regulation problem as an inexact steepest descent method for multicriteria optimization. European Journal of Operational Research, 235, 494-502. Rank A*.

18) Long, N.Van., Soubeyran, A., & Soubeyran, R.(2014). Knowledge accumulation within an organization. International Economic Review, 55(4), 1089-1128. Rank A.

19) Bento, G. C., Cruz Neto, J. C., & Soubeyran, A. (2014). A proximal point-type method for multicriteria optimization. Set-Valued and Variational Analysis, 22(3), 557-573. Rank A.

20) Bao, T. Q., Mordukhovich, B. S., & Soubeyran, A. (2014). Variational analysis in psychological modeling. Journal of Optimization Theory and Applications, 164(1), 290-315. Rank A.

21) Bao, T. Q., Mordukhovich, B. S., & Soubeyran, A. (2015). Fixed points and variational principles with applications to capability theory of wellbeing via variational rationality. Set-Valued and Variational Analysis, 23(2), 375-398. Rank A.

22) Bento, G. C., & Soubeyran, A. (2015). Generalized inexact proximal algorithms: Routine's formation with resistance to change, following worthwhile changes. Journal of Optimization Theory and Applications, 172(1), 1-16. Rank A.

23) Bento, G.C., & Soubeyran, A.(2015). A generalized inexact proximal point method for non smooth functions that satisfies Kurdyka Lojasiewicz inequality. Set-Valued and Variational Analysis, 23(3), 501-517. Rank A.

24) Bao, T.Q., Mordukhovich, B.S, & Soubeyran, A.(2015). Minimal points, variational principles, and variable preferences in set optimization. J. Nonlinear Convex Anal, 16, 1511-1537.Rank A.

25) Souza, J.C., Oliveira, P.R., & Soubeyran, A. (2015). Global convergence of a proximal linearized algorithm for difference of convex functions. Optimization Letters. 1-11.Rank B.

26) Bento, G.C., Cruz Neto, J.X., Lopes, J., Soares, Jr.P., & Soubeyran, A. (2016). Generalized proximal distances for bilevel equilibrium problems. Accepted for publication. SIAM J. Optim., 26(1), 810–830. Rank A*.

27) Bento, G.C., Cruz Neto, J.X., Soubeyran, A., & De Sousa, V. (2016). Dual descent methods as tension reduction systems. Journal of Optimization Theory and Applications. Volume 171, Issue 1, 209-227. First online: 16 August 2016. Rank A.

28) Bao, T.Q., & Soubeyran, A. (2016). Variational analysis in cone pseudo-quasi metric spaces and applications to group dynamics. Journal of Optimization Theory and Applications (2016): 1-18. Rank A.

5 Accepted for publication

29) Martinez Legaz, J.E., & Soubeyran, A.(2015). Convergence in a sequential two stages decision making process. Accepted for publication. Bulletin of the Iranian Mathematical Society. Rank C.

30) Bao,T.Q., Khanh, P., & Soubeyran,A. (2016). Variational principles with generalized distances and applications to behavioral sciences. Accepted for publication. Optimization. Rank B.

31) Bao, T.Q., Cobzas,S., & Soubeyran, A.(2016). Variational principles and Completeness in pseudo quasi metric spaces. Accepted in Annals of Operations Research. Rank.B.

6 In revision.

7 Submitted papers

32) Bento, G.C., Cruz Neto, J.X., Soares, Jr.P., & Soubeyran, A.(2014). Bilevel equilibrium problems as limits of variational traps . Submitted to JOTA. Rank A.

33). Sousa, J.C, Oliviera, P.R., & Soubeyran, A.(2015). A modified generalized proximal point algorithm for DC functions with application to the optimal size of the firm problem. Submitted to European Journal of Operational Research.

34) Bento, G.C., Cruz Neto, J.X., Soares, Jr.P., & Soubeyran, A.(2015). How to reach his desires: Variational rationality and the equilibrium problem on Hadamard manifolds. Submitted to JOTA. Rank A.

35) Bento, G.C., Lopez.G., Cruz Neto, J.X., & Soubeyran, A., & Souza, J.C.O.(2015). The proximal point method for locally Lipschitz functions in multiobjective optimization. Submitted to SIAMP OPT. Rank A*.

36) Moreno, F., Oliveira, P.R., & Soubeyran, A. (2013). Dual equilibrium problems: how a succession of aspiration points converges to an equilibrium. To be submitted.

8 ARXIV papers

37) Attouch, H., & Soubeyran, A. (2009). Worthwhile-to-move behaviors as temporary satisficing without too many sacrificing processes. Arxiv paper.

38) Bao,T.Q., Mordukhovich, B.S., & Soubeyran,A. (2013). Variational principles in models of Behavioral Sciences. Arxiv paper.

39) Bento, G.C., & Soubeyran, A.(2013). Inexact proximal algorithms in models of Behavioral Science. Arxiv paper.

9 Pre prints

40) Soubeyran, A. (2009). Variational rationality, a theory of individual stability and change: worthwhile and ambidextry behaviors". Pre-print. GREQAM, Aix Marseille University.

41) Soubeyran, A. (2010). Variational rationality and the unsatisfied man: routines and the course pursuit between aspirations, capabilities and beliefs. Pre-print. GREQAM, Aix Marseille University.

42) Soubeyran, A.(2016). Variational rationality, Part 1. A theory of worthwhile stay and change approach-avoidance transitions ending in traps. Preprint, GREQAM-AMSE, Aix Marseille University.

43) Soubeyran, A. (2015). A survey of worthwhile stay and change adaptive dynamics. A unifying variational rationality approach. Preprint, GREQAM-AMSE, Aix Marseille University.

10 In Preparation

44) Soubeyran, A. Variational rationality and aspiration gaps: a satisficing course poursuit between means adn ends. Pre print

45) Soubeyran, A. & Soubeyran, B. A value creation-value appropriation theory of organizational change: a variational approach. revised version 2008. Pre-print

46) Mordukhovich, B.S., & Soubeyran, A. The evolution of consideration sets.

47) Soubeyran, A. Satisficing by rejection. Pre-print.

48) Long, N., & Soubeyran, A. The psychology of doing nothing: decision avoidance and procrastination.

49) Long, N., & Soubeyran, A., Soubeyran, R. Knowledge workers: how to retain them.

50) Soubeyran, A. Variational games: balancing motivation and resistance to change.