



### CURRENT POSITION

Since 2014: **Lecturer of Economics**, Economics Division, Leeds University Business School, Leeds (UK).

### CURRENT TEACHING

Since 2016: Macroeconomics (MSc).

Since 2014: Understanding the Global Economy: Capitalist Institutions, Growth and Crisis (MSc).

Since 2014: Theories of Growth, Value and Distribution (BSc).

### PREVIOUS POSITIONS

2012-2014: Research Fellow, FESSUD European Project and iBuild Project, Leeds University Business School, Leeds, UK.

2010-2011: Research Fellow in Political Economy, Faculty of Economics, University of Bergamo, Italy.

2008-2009: Research Fellow in Political Economy, Faculty of Economics, University of Bergamo, Italy.

### PREVIOUS TEACHING

2014-2016: Current Topics in European Integration (BSc), University of Leeds, UK.

2010-2011: Advanced Macroeconomics, Faculty of Economics, University of Bergamo, Italy.

2009-2010: Economics of Monetary and Financial Markets, Faculty of Economics, University of Insubria (Varese), Italy.

2009-2010: Theory of the Firm, Faculty of Economics, University of Pavia, Italy.

2009-2010: Public Economics, Faculty of Law, University of Bergamo, Italy.

## AREAS OF EXPERTISE

- ✓ Monetary Economics
- ✓ Macroeconomic Dynamics
- ✓ Theory of Value, Price and Distribution
- ✓ History of Economic Thought

## CURRENT RESEARCH AND WORK IN PROGRESS

- : 'Unconventional monetary policy from conventional models?' (with G. Fontana).
- : 'A social and ecological use-value critique of utility-based methods of valuation of social projects?' (with A. Brown).
- : 'Dominant Ideas, Political Order and Vested Interests from a Heterodox Perspective' (with G. Fontana).
- : 'Productivity growth, Smith effect and Ricardo effect in EU countries' (with A. Godin and S. Lucarelli).

## ARTICLES IN PEER-REVIEWED JOURNALS

- 2016: 'The Extent of Financialisation: A Cross-Country Comparison' (with A. Brown and D. Spencer), *Revista de Economia Mundial / Journal of World Economy*, forthcoming.
- 2016: 'Introduction: the Theoretical Legacy of Augusto Graziani' (with R. Bellofiore), *Review of Keynesian Economics*, **4**(3): 243-49.
- 2015: 'The monetary circuit in the age of financialisation: a stock-flow consistent model with a twofold banking sector' (with M. Sawyer), *Metroeconomica*, published online, doi: 10.1111/meca.12103. **(ABS 2015: ★)**
- 2015: 'Capital's humpback bridge. Financialisation and the rate of turnover in Marx's economic theory' (with H. Baron), *Cambridge Journal of Economics*, **39**(5), pp. 1415-1441. **(ABS 2015: ★★)**
- 2015: 'Moneta, finanza e crisi: Marx nel circuito della moneta' [Money, finance and the crisis: Marx in the monetary circuit], *Iride. Filosofia e Discussione Pubblica*, **28**(74), pp. 67-78
- 2014: 'Financialization and the monetary circuit: a macro-accounting approach', *Review of Political Economy*, **26**(1), pp. 128-148. **(ABS 2015: ★★)**
- 2014: 'Welfare, mercato e piano: critica del paradigma liberoscambista' [Welfare, market and the economic planning: a critique of the free-market paradigm], *Ragion Pratica*, **42**(1), pp. 9-33.
- 2012: 'A simplified stock-flow consistent dynamic model of the systemic financial fragility in the "New Capitalism"', *Journal of Economic Behavior & Organization*, **83**(3), pp. 570-582. **(ABS 2015: ★★)**
- 2012: Review of 'Inequality and instability' by James K. Galbraith, *Economic Issues*, **17**(2), pp. 114-115. **(ABS 2015: ★)**
- 2012: 'Finanse i problem realizacji u Róży Luksemburg: interpretacja "cyrkulatywistyczna"' [Finance and the realization problem in Rosa Luxemburg: a 'circuitist' reappraisal] (with R. Bellofiore), *Praktyka Teoretyczna*, **6**(1), pp. 275-298.
- 2011: 'From the village fair to Wall Street. The Italian reception of Minsky's economic thought', *Rassegna Economica*, **74**(1), pp. 111-132.

- 2010: 'The paradox of tranquility revisited. A Lotka-Volterra model of the financial instability', *Rivista Italiana degli Economisti – Italian Economic Journal*, **15**(1), pp. 69-104.
- 2010: 'Concorrenza senza equilibrio. La 'Scoperta Imprenditoriale' nella Teoria Economica Austriaca' [Competition without equilibrium. The 'Entrepreneurial Discovery' in Austrian Economics] (with H. Baron), *Storia e Politica*, **2**(2), pp. 416-442.
- 2009: 'Marx in the matrix. L'algebra del 'lavoro vivo' [The algebra of the 'living labour']', *Storia del Pensiero Economico / History of Economic Thought and Policy*, **6**(2), pp. 31-48.

#### CHAPTERS AND ENTRIES IN BOOKS

- 2016: 'A Marx "crises" Model. The reproduction schemes revisited', in A. Moneta, T. Gabellini and S. Gasperin (eds.), *Economic Crisis and Economic Thought: Alternative Theoretical Perspectives on the Economic Crisis*, London: Routledge, forthcoming.
- 2016: 'Monetary Theories of Production', in T. Jo, L. Chester and C. D'Ippoliti (eds.), *Handbook of Heterodox Economics*, London: Routledge, forthcoming.
- 2015: 'Financial integration', in L.-P. Rochon and S. Rossi (eds.), *The Encyclopedia of Central Banking*, Northampton: Edward Elgar, pp. 195-197.
- 2015: 'Minsky', in L.-P. Rochon and S. Rossi (eds.), *The Encyclopedia of Central Banking*, Northampton: Edward Elgar, pp. 315-318.
- 2012: 'New Research Perspectives in the Monetary Theory of Production: an Introduction' (with S. Lucarelli), in S. Lucarelli and M. Passarella (eds.), *New Research Perspectives in the Monetary Theory of Production*, Bergamo: Bergamo University Press of Sestante Edizioni, pp. 13-21.
- 2012: 'A re-formulation of Minsky's "two-price model"', in S. Lucarelli and M. Passarella (eds.), *New Research Perspectives in the Monetary Theory of Production*, Bergamo: Bergamo University Press of Sestante Edizioni, pp. 109-126.
- 2010: 'Minsky in the 'new' capitalism. The new clothes of the Financial Instability Hypothesis' (with R. Bellofiore and J. Halevi), in D. Papadimitriou and L.R. Wray (eds.), *The Elgar Companion to Hyman Minsky*, Northampton: Edward Elgar, pp. 84-99.
- 2009: 'Finance and the realization problem in Rosa Luxemburg: a 'circuitist' reappraisal' (with R. Bellofiore), in J.F. Ponsot and S. Rossi (eds.), *The Political Economy of Monetary Circuits: Tradition and Change in Post-Keynesian Economics*, Basingstoke & New York: Palgrave Macmillan, pp. 98-115.

#### BOOKS AND PAMPHLETS

- 2012: *L'austerità è di destra. E sta distruggendo l'Europa* [Austerity is rightish. And it is destroying Europe] (with E. Brancaccio), Milan: Il Saggiatore.

## **'FESSUD' PROJECT WORKING PAPERS AND STUDIES**

- : 'Aggregate Demand, Money and Finance within the New Consensus Macroeconomics: a Critical Appraisal' (with G. Fontana), *FESSUD Working Paper Series*.
- : "'Keynesian" Economists on Method, Money and Policy in the Wake of the 2007 Financial Crisis and the Great Recession' (with G. Fontana), *FESSUD Working Paper Series*.
- 2015: 'The nature and variegation of financialisation: a cross-country comparison' (with A. Brown and D. Spencer), *FESSUD Working Paper Series*, No. 127.
- 2015: 'The Swedish Financial System' (with A. Stenfors, E. Clark, I. Farahani, and A.L. Hansen), *FESSUD Studies in Financial Systems*, No. 13.
- 2014: 'The Process of Financial Integration of EU Economies', *FESSUD Working Paper Series*, No. 30.
- 2014: 'Financialisation in the Circuit' (with M. Sawyer), *FESSUD Working Paper Series*, No. 18.
- 2013: 'Financial Integration in the European Union: an Analysis of the ECB's role', *FESSUD Working Paper Series*, No. 4.

## **'i-BUILD' PROJECT REPORTS**

- 2014: 'The Economics of Infrastructure' (with A. Brown and M. Robertson), in A. Brown and M. Robertson (eds.), *Economic evaluation of systems of infrastructure provision: concepts, approaches, methods*, i-BUILD/Leeds Report, pp. 12-17.
- 2014: 'The "Systems of Provision" Approach and the Evaluation of Infrastructures: Some Preliminary Insights' (with M. Boffo), *working paper*.

## **OTHER WORKING PAPERS**

- 2016: 'A Marx "crises" Model. The reproduction schemes revisited', *PKSG Working Paper Series*, WP No. 1610.
- 2013: 'Capital's *Pons Asinorum*: the rate of turnover in Karl Marx's labour-theory of value' (with H. Baron), *STOREP Papers*, WP No. 16 (also: *Munich Personal RePEc Archive*, WP No. 48306).
- 2012: 'Systemic financial fragility and the monetary circuit: a stock-flow consistent Minskian approach', *University of Bergamo, Working Papers at the "Hyman P. Minsky" Department of Economic Studies*, WP No. 2(2012).
- 2011: 'The two-price model revisited. A Minskian-Kaleckian reading of the process of "financialization"', *Munich Personal RePEc Archive*, WP No. 32033.
- 2011: 'A simplified stock-flow consistent dynamic model of the systemic financial fragility in the 'New Capitalism'', *Munich Personal RePEc Archive*, WP No. 28499.
- 2011: 'Systemic financial fragility and the monetary circuit: a stock-flow consistent approach', *Munich Personal RePEc Archive*, WP No. 28498.

- 2011: 'Per una storia analitica dell'economia politica. Alcune considerazioni sulle prospettive della Storia del Pensiero Economico' [Notes for an analytical history of the political economy], *Munich Personal RePEc Archive*, WP No. 286704 [an early version has been published in: *Foedus: Culture, Economie e Territori*, 2007, 18(2): 9-20].
- 2010: 'Concorrenza senza equilibrio. La 'scoperta imprenditoriale' nella Teoria Economica Austriaca' [Competition without equilibrium. The 'entrepreneurial discovery' in Austrian Economic Theory] (with H. Baron), *Munich Personal RePEc Archive*, WP No. 28505.
- 2010: 'Rethinking economics after the financial crisis. A Minskian-Kaleckian stock-flow consistent accounting framework', *Jean Monnet Centre of Excellence in European Law and Governance, King's College London*, WP No. 2010-02.

### EDITING OF BOOKS AND SPECIAL ISSUES

- 2012: *New Research Perspectives in the Monetary Theory of Production* (with S. Lucarelli), Bergamo: Bergamo University Press of Sestante Edizioni.
- 2016: 'The Theoretical Legacy of Augusto Graziani' (with R. Bellofiore), *Review of Keynesian Economics*, forthcoming.

### REFEREEING

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| ✓ Cambridge Journal of Economics                                       | ✓ PSL Quarterly Review                       |
| ✓ Ecological Economics   | ✓ Review of Keynesian Economics              |
| ✓ Economia Politica: Journal of Analytical and Institutional Economics | ✓ Revue de la Regulation / Regulation Review |
| ✓ European Journal of Economic and Social Systems                      | ✓ Savings and Development                    |
| ✓ Journal of Economic Dynamics and Control                             | ✓ Theatre, Dance and Performance Training    |

### GUEST LECTURES AND SEMINARS

- 2016, 22/03: Séminaire 'Capitalisme Cognitif', Maison des Sciences Économiques, Paris, France: 'The Monetary Circuit in the Age of Financialisation'.
- 2016, 21/03: Séminaire de l'Axe 1 du CEPN, Paris, France: 'The Monetary Circuit in the Age of Financialisation'.
- 2015, 28/7: 5<sup>th</sup> FMM International Summer School, 'Keynesian Macroeconomics and European Economic Policies', Berlin, Germany. Presentation: 'The Monetary Circuit in the Age of Financialisation'.
- 2014, 5/11: IIPPE Training Workshop on 'The Political Economy of Value and Price', SOAS, London. Guest Lecture: 'A History of the Labour Theory of Value'.
- 2014, 15/09: IIPPE Training Workshop on 'The Political Economy of Value and Price', University of Naples 'L'Orientale', Naples, Italy. Guest Lecture: 'A History of the Labour Theory of Value'.
- 2014, 16/04: University of Bergamo, Faculty of Economics. Guest Lecture: 'La crisi dell'economia italiana all'interno della crisi dell'Area Euro. Un'interpretazione basata sul paradigma della riproducibilità' [The Italian economic crisis within the Euro Area crisis. An interpretation based on the reproduction paradigm].
- 2013, 15/03: University of Sheffield, Management School. Guest Lecture: 'Financial Disintegration of the Euro area. Some considerations from an analysis of ECB's official reports'.

- 2011, 5/10: Workshop on 'Schumpeterian-Keynesian Perspectives to Macroeconomics', Department of Economics, University of Bergamo. Lecture: 'The two-price model revisited. A Minskian-Kaleckian reading of the process of 'financialization''.
- 2011, 22/03: University of Bergamo, Department of Economics, Lunch Seminar. Lecture: 'Systemic financial fragility and the monetary circuit: a stock-flow consistent approach'.
- 2011, 18/03: PhD in Economics, University of Pavia, History of Economic Analysis. Lecture 2: 'The economic thought of David Ricardo'.
- 2011, 28/03: PhD in Economics, University of Pavia, History of Economic Analysis. Lecture 5: 'From Austrian School to the Entrepreneurial Discovery Approach'.
- 2010, 26/04: PhD in Economics, University of Pavia, History of Economic Analysis. Lecture 9: 'Endogenous theory of money: credit and financial circuit'.

### **PRESENTATIONS IN INTERNATIONAL CONFERENCES**

- 2015, 26/02-1/03: 41<sup>st</sup> Eastern Economic Association Annual Conference (EEA), New York, US. Presentation: 'The Monetary Circuit in the Age of Financialisation. A Stock-Flow Consistent Take' (with M. Sawyer).
- 2014, 23-35/10: 55<sup>th</sup> Annual Conference of the Italian Economic Association (SIE), Trento, Italy. Presentation: 'Unconventional Monetary Policy from Conventional Models?' (with G. Fontana).
- 2014, 16-18/09: 5<sup>th</sup> IIPPE Annual Conference, University of Naples 'L'Orientale', Naples, Italy. Presentation: 'Whither Basic Income in a Monetary Circuit Frame? A Friendly but Critical Appraisal' (with M. Boffo).
- 2014, 26-28/06: 11<sup>th</sup> STOREP Conference, Bergamo, Italy. Presentation 1: 'Unconventional monetary policy from conventional models?' (with G. Fontana). Presentation 2: 'Whither Basic Income in a Monetary Circuit Frame? A Friendly but Critical Appraisal' (with M. Boffo).
- 2014, 22-24/06: FEBS Conference, University of Surrey, Guildford, UK. Presentation: 'Unconventional monetary policy from conventional models?' (with G. Fontana).
- 2013, 24-26/10: 17<sup>th</sup> Conference of the Research Network Macroeconomics and Macroeconomic Policies (RNM), Berlin, Germany. Presentation: 'Demand, money and finance within the New Consensus Macroeconomics: a critical appraisal' (with G. Fontana).
- 2013, 23/10: 'What is "financialisation"?', SOAS University, London, UK. Presentation: 'Financialisation and Financial Integration. Outline of the FESSUD Synthesis Report'.
- 2013, 26-29/06: 1<sup>st</sup> World Keynes Conference, Izmir, Turkey. Presentation: 'Financial integration in the European Union: an analysis of ECB's official reports'.
- 2013, 21-22/06: 'Welfare o barbarie?', workshop promoted by Ragion Pratica. Presentation: 'Attualità del piano. Critica del paradigma liberoscambista' [Modernity of the economic planning. Critique of the Neoliberal paradigm].

- 2013, 7/06: Annual Workshop of the Post Keynesian Study Group, SOAS University, London, UK. Presentation: 'A reformulation of Minsky's 'two-price model''.
- 2013, 31/05-02/06: 10<sup>th</sup> STOREP Conference, Gaeta, Italy. Presentation: 'Capital's *pons asinorum*: the rate of turnover in Karl Marx's analysis of capitalist valorisation' (with H. Baron).
- 2013, 31/05-02/06: 10<sup>th</sup> STOREP Conference, Gaeta, Italy. Round Table: 'Dove sta andando la storia del pensiero economico?' [Where is the history of economic thought going?].
- 2013, 16-18/05: 17<sup>th</sup> ESHET Conference, London, UK. Presentation 'Capital's *pons asinorum*: the rate of turnover in Karl Marx's analysis of capitalist valorisation' (with H. Baron).
- 2013, 21-13/03: 12<sup>th</sup> AISPE Conference, Florence, Italy. Presentation: 'Capital's *pons asinorum*: the turnover coefficient in Karl Marx's labour-theory of value' (with H. Baron).
- 2012, 6-8/12 6<sup>th</sup> Dijon International Conference, Dijon, France. Presentation: 'Financialisation and the Monetary Circuit: a Macro-Accounting Heterodox Approach'.
- 2012, 26-27/10: 16<sup>th</sup> Conference of the Research Network Macroeconomics and Macroeconomic Policies (RNM), Berlin, Germany. Presentation: 'Financialisation and the Monetary Circuit: a Macro-Accounting Heterodox Approach'.
- 2012, 28-29/06: 9<sup>th</sup> International Conference, 'Development in Economic Theory and Policy', Bilbao, Spain. Presentation: 'Financialisation and the Monetary Circuit: a Macro-Accounting Heterodox Approach'.
- 2012, 1-3/06: 9<sup>th</sup> STOREP Conference, Padova, Italy. Presentation: 'Financialisation and the Monetary Circuit: a Macro-Accounting Heterodox Approach'.
- 2011, 5/12: 'Il profeta della crisi. Tributo a Hyman Minsky', Conference promoted by Fondazione A.J. Zaninoni and Department of Economics of University of Bergamo, Bergamo, Italy. Presentation: 'From the village fair to Wall Street. The Italian reception of Minsky's economic thought'.
- 2011, 1-3/12: 11<sup>th</sup> AISPE Conference, Pisa, Italy. Presentation: 'From the village fair to Wall Street. The Italian reception of Minsky's economic thought'.
- 2011, 28-29/10: 15<sup>th</sup> Conference of the Research Network Macroeconomics and Macroeconomic Policies (RNM), Berlin, Germany. Presentation: 'The two-price model revisited. A Minskian-Kaleckian reading of the process of 'financialization''.
- 2011, 14-15/10: 52<sup>nd</sup> Annual Conference of the Italian Economic Association (SIE), Rome, Italy. Presentation: 'The two-price model revisited. A Minskian-Kaleckian reading of the process of 'financialization''.
- 2011, 9-11/06: 8<sup>th</sup> STOREP Conference, Minervino di Lecce, Italy. Presentation: 'The two-price model revisited. A Minskian-Kaleckian reading of the process of 'financialization''.
- 2011, 13-14/05: 5<sup>th</sup> 'Dijon' International Conference, Roskilde University, Denmark. Presentation: 'The two-price model revisited. A Minskian-Kaleckian reading of the process of 'financialization''.

- 2010, 29-30/10: 14<sup>th</sup> Conference of the Research Network Macroeconomics and Macroeconomic Policies (RNM), Berlin, Germany. Presentation: 'Minsky beyond Minsky. A stock-flow consistent framework for the analysis of the financial instability'.
- 2010, 8/10: JMCE Research Student Workshop: 'Rethinking Europe after the Financial Crisis', King's College, London, UK. Presentation: 'Rethinking economic theory after the financial crisis: A Minskian stock-flow consistent accounting framework'.
- 2010, 1-2/10: International Conference: 'Can it happen again? Sustainable policies to mitigate and prevent financial crises', University of Macerata, Italy. Presentation: 'Minsky, the monetary circuit and the current crisis: a SFC model' (with R. Bellofiore).
- 2010, 30/05 -1/06: 7<sup>th</sup> STOREP Conference, Trento, Italy. Presentation 1: 'Ripensare Minsky. Un modello "stock-flow consistent" per l'analisi dell'instabilità economica e finanziaria'. Presentation 2: 'If anything goes wrong. Re-reading Minsky after the Great Recession' (with R. Bellofiore and J. Halevi).
- 2010, 26-27/01: The global crisis. Contribution to the critique of economic theory and policy, Siena, Italy. Presentation: 'Commento a Barba e Pivetti. Cambiamenti nella distribuzione del reddito, disordine finanziario e crisi'.
- 2009, 30-31/10: 13<sup>th</sup> Conference of the Research Network Macroeconomics and Macroeconomic Policies (RNM), Berlin, Germany. Dissertation: 'How useful is Minsky to explain the current crisis?' (with R. Bellofiore).
- 2009, 3-4/06: 6<sup>th</sup> STOREP Conference, Florence, Italy. Presentation: 'No country for Ponzi. A sequential re-definition of the Financial Instability Hypothesis'.
- 2008, 27-29/03: 10<sup>th</sup> AISPE Conference, Treviso, Italy. Presentation: 'Marx in the matrix. L'algebra del lavoro vivo'.

#### **PARTICIPATION IN NATIONAL AND INTERNATIONAL PROJECTS**

- 2012:- Financialisation, Economy, Society & Sustainable development (FESSUD), webpage: <http://fessud.eu/>.
- 2013:- Infrastructure, Business models valuation and Innovation for Local Delivery (i-BUILD), webpage: <http://research.ncl.ac.uk/ibuild/>.

#### **EDUCATION**

- 2008: PhD in History of Economic Doctrines, Faculty of Economics, University of Florence, Italy.
- 2001: MSc and BSc (Laurea) in Business Economics, University of Bologna, Italy.

#### **SUMMER/WINTER SCHOOLS**

- 2011, 18-26/06: Levy Economics Institute of Bard College, New York: 'Hyman P. Minsky Summer Seminar 2011'.
- 2010, 14-16/12: University of Pavia and IUSS, 'The financial crisis: analysis and modeling / The SFC approach', seminars of G. Zezza.
- 2009, 20-21/11: Centre d'Economie de Paris Nord: 'The recent developments in Post-Keynesian modelling'.



- 2009, 9-12/09: AISPE International Summer School (7<sup>th</sup> edition), Lucca: 'The global financial crisis: historical and theoretical approaches'.
- 2007, 5-8/09: AISPE International Summer School (5<sup>th</sup> edition), Lucca: 'Journals and historiography in the history of economic thought'.
- 2006, 6-9/09: AISPE International Summer School (4<sup>th</sup> edition), Lucca: 'Historiography of Economic Thought: tools and methodology'.

## **LANGUAGE AND COMPUTER SKILLS**

- ✓ Italian: native.
- ✓ English: fluent.
- ✓ French: reading.
- ✓ Software: Office, TeXworks (LaTeX), EViews, Gretl, MATLAB.

## **MEMBERSHIPS AND OFFICES**

- ✓ Member of the Italian Association for the History of Economic Thought (AISPE).
- ✓ Member of the European Society for the History of Economic Thought (ESHET).
- ✓ Member of International Initiative for Promoting Political Economy (IIPPE).
- ✓ Member of Post-Keynesian Study Group (PKSG)
- ✓ Member of the Royal Economic Society (RES).
- ✓ Member of the Italian Society of Economists (SIE).
- ✓ Member of the Association for the History of Political Economy (STOREP).
- ✓ Member of the World Economics Association (WEA).

## **VISITING SCHOLARSHIPS**

- 2016: University of Bergamo, from June 6<sup>nd</sup> to July 5<sup>nd</sup> 2016.
- 2015: University of Bergamo, from June 2<sup>nd</sup> to July 2<sup>nd</sup> 2015.

## **INDIVIDUAL AWARDS AND RECOGNITIONS**

- 2014: *STOREP Award*, for the best article presented at the 10<sup>th</sup> STOREP Conference, 2013. Title: 'Capital's *Pons Asinorum*: the rate of turnover in Karl Marx's labour-theory of value' (with H. Baron).

2010: *Grant for Young Scholars*, at the 7<sup>th</sup> STOREP Conference, 2010. Paper: 'Ripensare Minsky. Un nuovo modello teorico e alcune evidenze empiriche sugli Stati Uniti d'America' [Rethinking Minsky. A new theoretical model and some empirical evidences on the United States of America].

2008: *AISPE Award in memory of Costantino Bresciani Turrone* (4<sup>th</sup> Edition) for the best article presented at the 10<sup>th</sup> AISPE Conference, 2008. Title: 'La nuova algebra della trasformazione' [The new algebra of the transformation].

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