Meeting the challenge of providing sufficient and high quality food for the World is a hunger reducing necessity, which is an imperative for global sustainability and economic prosperity. Much of the popular emphasis for the scientific contribution to help meet this challenge is focussed on climate change and global warming. At a specific level of contextual detail, studies continue with climate variation and environment factor influences on agronomy, giving rise to an emerging domain of multi-disciplinary research activity known as agrometeorology.

Agronomy can be considered as combining agriculture, viticulture and horticulture. For each of these crop production contexts, timely and accurate environment impact information is critical for decision-making precision. Climate in particular, plays a significant role in determining crop yield and quality. The term agrometeorology has emerged to represent the area of research specifically related to climate studies in the agronomic domain.

This presentation will describe how work in the area of agrometeorology relates to geocomputation, which is another so-called ‘new’ multi-disciplinary (some use the term trans-disciplinary) field that combines mathematics, computer science, information systems, electrical engineering, geodetic science, geography, econometrics and various associated disciplines such as plant biology and physiology, soil science and a range of environmental sciences.

In this presentation, as an example of agrometeorology, an international collaborative research project will be described with particular reference to vineyard management. A wireless sensor network (WS) terrestrial telemetry architecture is outlined together with a description of its implementation from concept, through design and development, to deployment in the field. Details of the sensors, their calibration and testing will also be provided. The sensor arrays are housed in a framework with their own (solar) power supplies, GPS, Wi-Fi transmitter and micro-computer for in situ signal processing and data communications protocol processing. Data is passed from individual sensor arrays at parameterised intervals through a coordinating node (a gateway) to an Internet enabled upload process to a central server. This server acquires data from all the international locations. Monitoring software on the server provides immediate real-time reporting to each location while also populating a ‘public’ website, which illustrates analysed data in terms of actual and trend information. This information system and its use will be outlined.

Processing the monitored data for a variety of purposes requires geostatistical analyses and mathematical modelling. Some data is interpolated (using inverse distance weighting, kriging, etc) for use with GIS applications (some examples will be given) and in the case of estimation or prediction of single data values or events, models with more sophistication such as the ensemble Kalman filter (EnKF) are used.
The real-time monitoring system and web-based information system are designed for use by decision-makers. Some examples of this information being used by crop managers will be described, as will some research projects underway by members of the international scientific team.

Speaker’s Biography

Dr Philip J. Sallis completed a PhD in the area of meta-information process modelling at City University London in 1979. Since then he has held academic position in England, Australia and New Zealand, with past and current research professorships in the USA, Hong Kong and Chile. He was appointed to the Foundation Chair in Information Science at The University of Otago, New Zealand in 1987, a position he held for 13 years. In 1999 he became Deputy Vice Chancellor at the Auckland University of Technology (AUT) where he led the academic, research innovation and enterprise activities of the university. Choosing to leave that role after a decade, he returned to full-time research and is now Director of the Geoinformatics Research Centre at AUT, while also retaining the position of Pro Vice Chancellor, assisting the Vice Chancellor with a range of strategic planning and ambassadorial tasks.

Philip’s return to full-time research was for the most part because he wanted to pursue some ideas he had for environment monitoring and modelling related to agronomy. His keynote lecture describes how this idea took hold and how it has provided him with an opportunity for leadership of an innovative international collaboration of academics, scientists and practitioners, especially in the wine industry. He will outline the overall concept for the research programme, the wireless sensor Network (WSN) he and his colleagues have designed, built and deployed across eight countries together with the real-time environment monitoring software and web-base information system designed for use by managers and decision-makers in the field. He will also describe the data modelling approaches being used for estimation/prediction of event information and the range of projects being worked on by members of his international research group.

Since completing his doctoral studies Philip has been at the forefront of tertiary computing education for 35 years and held senior academic and research development positions. He has been a regular conference speaker, publisher of journal articles and books, designer of curriculum and member of numerous review committees including ACM, IEEE, SEARCC, the BCS and other international computing groups. He was for 3 years President of the NZCS during which time he was a chair of three NZ government commissions relating to computing in schools, science curriculum and information technology with industry. His awards include an IBM doctoral research scholarship, a Davidson Trust Research Fellowship, a United States Library of Congress (National Digital Mapping Archive) research award, two Australian and two New Zealand research awards, two professional fellowships and several research funding grants in the UK, USA, Australia, New Zealand and Chile.

With his wife Dr Kathy Garden, he spends several months each year in Chile where from his position as Adjunct Research Professor at the Catholic University in Maule (Geospatial information Processing Laboratory) he coordinates the work of the GRC throughout South America. He also works closely with the Environmental Research Laboratory at Ritsumeiken Asia-Pacific University to which he makes frequent visits.

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Face Analysis, Comparison and Matching:

- Face capturing
- Fitting points
- File (mesh/colour)
- 3D Face model

Biomedical Imaging

After choosing the image that best represents the pathology of the case, double-clicking on the region where pathology is shown will activate the image Match search engine and automatically transfer you to the Results page.

Color Image Segmentation - Experiment 1
Intensity Distinguishable

Color Image Segmentation - Experiment 2
Hue Distinguishable
Speaker’s Biography

Dr Patrick S.P. Wang, PhD, is:

- Fellow of IAPR, ISIBM and WASE, IEEE Outstanding Achievement Awardee
- Tenured Full Professor, Northeastern University, USA, iCORE (Informatics Circle of Research Excellence).
- Visiting Professor, University of Calgary, Canada.
- Otto-Von-Guericke Distinguished Guest Professor, Magdeburg University, Germany
- Zijiang Visiting Chair, ECNU, Shanghai, China.
- NSC Visiting Chair Professor, NTUST, Taipei, Taiwan
- Honorary advisory professor of several key universities in China, including Sichuan University, Xiamen University, East China Normal University, Shanghai, and Guangxi Normal University, Guilin.
- Prof. Wang received his BSEE from National Chiao Tung University (Jiaotong University), MSEE from National Taiwan University, MSICS from Georgia Institute of Technology, and PhD, Computer Science from Oregon State University.
- Published over 26 books, 160 technical papers, 3 USA/European Patents, in PR, AI, TV, Cybernetics and Imaging
- Founding Editor-in-Chief of IJPRAI (International Journal of Pattern Recognition and Artificial Intelligence), and Book Series of MPAI, WSP.
- Co-Chief Editor, IJPRAI and MPAI Book Series, WSP Northeastern University, Boston, MA, USA.

In addition to his technical interests, Dr. Wang also published a prose book, “Harvard Meditation Melody” and many articles and poems regarding Du Fu and Li Bai’s poems, Beethoven, Brahms, Mozart and Tchaikovsky’s symphonies, and Bizet, Verdi, Puccini and Rossini’s operas.

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Bibliography (selected from over 2 dozens of technical papers and books)

Since 2000 the relatively old CSSL standard for simulation systems has become obsolete, and new standards and techniques for system simulation are arising. At modelling level, Physical Modelling or Component-based Modelling has introduced a new era for multidomain modelling and system simulation. The ‘components’ may be part of textual or graphical libraries in various domains. With Modelica and with competitive VHDL-AMS modelling languages with a certain standard have emerged, using component-based modelling with a-causal relations; the figure at right shows graphical physical modelling in mechanics and electrical engineering. Of course it makes sense to couple this component based a-causal graphical modelling with the classical signal-oriented graphical modelling.

From mathematics’ viewpoint, instead of explicit state models now implicit ‘law-oriented’ model descriptions have become basis for subsequent simulation, resulting in implicit differential-algebraic systems (DAEs). The additional algebraic equations have emerged a new problem, which relates to simulation level. In principle, the simulator must translate the model description into a DAE system with proper structure of differential and algebraic equations for the extended state space (consisting of differential states and algebraic states), so that a ‘modern’ DAE solver can handle the implicit state space model with sufficient accuracy and sufficient convergence. These conditions are given, if roughly speaking, dependencies of differential states and algebraic states are not too ‘weak’; unfortunately this is not the case in many e.g. mechatronic systems. Here either the simulation system is capable of automatic symbolical ‘extension’ of the systems (introduction of new differential states by differentiating the system symbolically – so-called index reduction), or the model description is split into different models, whereby the algebraic conditions only control switching between the models (handling a Structural-dynamic System). Consequently modern DAE solvers offer also features for state event handling: the solver checks the algebraic condition.

The algebraic equations, e.g. constraints, are coming along with another new challenge, with structural dynamic systems, which on the other hand are also coming along with parallel and serial model coupling (co-simulation). Constraints are very often coupled with state-dependent conditions for their validity – like loss of freedom, etc., requiring a conditional change of the model description controlled by thresholds etc. – and resulting in Structural-dynamic Systems; the problem of state event description and state event handling becomes much more complex than in classic ODE models and raises new questions for proper hybrid model description. Hybrid systems and Structural-dynamic Systems are more or less efficiently supported at modelling level, but another novelty in system simulation can help: statechart descriptions.

While object oriented programming became the quasi standard of software development, the object-oriented modelling paradigm, as a method for modelling of systems, has emerged as very useful for modelling of simulation models and object-oriented techniques have been introduced in simulation modelling. Especially statechart diagrams as part of the Unified Modelling Language (UML), a set of graphical modelling techniques and the de facto modelling standard in object-oriented programming, have shown to be really useful for discrete event simulation modelling.
Statechart diagrams were introduced by David Harel of the Weizmann Institute of Science in the 1980s. He extended the conventional state-transition-diagram formalism by the concepts of hierarchy, concurrency and communication. The basic principles of state-transition modelling include only a handful of concepts, basically drawing states a system can be in and transitions from one state to another. But not until the adding of the principles invented by Harel, statechart modelling became a powerful and at the same time easy to apply method to model arbitrary systems. The first version of statecharts was applicable for just discrete systems, but in the meantime a real time compliant version as part of the UML for real time (UML-RT) standard, was developed, allowing also ‘dynamic states’ governed by ODEs/DAEs. With hybrid statecharts – the figure at left shows an example for the pilot ejection model – the era of Dynamic Statechart Modelling started.

The Physical Modelling approach sets new challenges for the translators of simulation systems, with some side effects to the environments (simulation level/runtime level/experiment level) of the simulation systems. The Dynamic Statechart Modelling approach not only sets challenges for the modelling level, the approach but also sets challenges for the experiment level and the approach constitutes a generic alliance between model frame and experimental frame – in contrary to Zeiglers early postulation of ‘separation of model frame and experimental frame’.

These developments can be characterised and classified by challenging features, as well for the model frame as well as for the experiment frame, as well as for the environment of the simulation system:

- Model Sorting
- DAE Solver
- Index Reduction
- Open Equation Access
- Event Description
- State Event Handling
- Physical Modelling - Text
- Physical Modelling - Graphics
- Modelica Modelling
- AMS Modelling
- State Chart Modelling - Graphics
- State Chart Modelling - Text
- Structural Dynamic Systems
- Functional Hybrid Modelling
- Solver Splitting
- Multirate Solvers
- Frequency Analysis
- Visualisation

The features on the one side constitute challenges for the simulation system, but on the other side their availability or their lack cause advantages and disadvantages, and sometimes the availability may also become a risk.

The discussion of impact of the challenging features for simulation systems is based on the ARGESIM Benchmarks - Benchmarks for Modelling Approaches and Simulation Techniques. Up to now twenty benchmarks have been defined, and about 320 solutions / results / suggestions for modelling and implementation have been sent in and published in SNE (Journal Simulation News Europe). These results allow various evaluations and give deep insight into modelling approaches and features of simulators and about the nature of the challenging ‘new’ features.
Speaker’s Biography

Felix Breitenecker is professor for Mathematical Modelling and Simulation at Vienna University of Technology and head of the ARGESIM group which is involved into master programs, PhD programs and various research projects in modeling and simulation and which is editing the journal SNE – Simulation News Europe and running benchmarks on M&S approaches.

Felix Breitenecker is author of five books and of about 300 scientific publications in the area of modeling and simulation. Recent research activities include physical modeling (port-based DAE modeling), elearning with/for modeling and simulation, modeling and simulation in physiology and health care systems.

Felix Breitenecker is active in various simulation societies and simulation activities in Europe. At present he is president of ASIM, the German simulation society, and board member of EUROSIM, the Federation of European Simulation Societies.

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To identify the parameters from the transient response, on proportional second order process when in the numerator is the only gain, and the characteristic equation have two different time constants, the Strejc’s method, which is generally known, is used most commonly [3]. After identification by this method obtained parameters are satisfactory, but not precise. But exact parameters are needed for the verification of digital control algorithms, especially for its real-time verification [4], [5]. Commonly we used such kind of synthesis method, which the control loop response should be on the aperiodic border (this is the "best" quality of control loop response). If the actual response will be with overshooting or it's too damping, we need to determine which errors causes this If we know that the identification is correct, then the errors can be easier found.

The first half of presentation will discuss why Strejc method does not allow accurate parameter estimation and how improvement can be ensured. It is clear that with recursive least squares methods more accurately parameters can be obtained than with Strejc method. This extension is particularly appropriate for teaching the foundations of identification and control namely. For basic methods of identification from transient responses it is very important from pedagogical reasons, when they are clear and allow obtain accurate results.

If transfer function of the proportional second order process contains one time constant in the numerator, it is not possible to identify parameters from transient response. Neither the use of recursive least squares method is not sufficient to determine this time constant, because the structure of the original continuous transfer function and discrete transfer function (as the identification result) are different. This is illustrated in the second half of this article. This structure can be used for modelling dynamics reaction of driver in the car [2] in the eye – hands and eye-foot channels. Finding of this time constant is needed, because it represents a prediction in the model of the driver's behaviour.

Parameters Identification For The Second Order Process From Transient Response: We need to identify the parameters of the proportional second order system from the transient characteristics when in the numerator of the transfer function (1) is only the gain. Known Strejc method suitable for this task is well described in [3]. It is unnecessary to describe the derivation of two transcendental equations (4), (5) in detail, which form the basis of the method. The precondition from which this method was derived is that transient characteristics intersect at one point, as can be seen from the transient characteristics in Fig. 1 (in a relative time and amplitude). It is assumed that transfers function (2) and (3), taking into account the changes of “τ2” between zero and the one, are the limit cases of transfer function (1). If only the ratio of time constants “τ2”is changed, the position of the intersection point of transient characteristics is not changed. If it changes the sum of the time constants, linear in time is changed the position of the intersection point. Since that the intersection of the transient characteristics (1) (2) and (3) is valid to the transient functions. From this assumption then can be derived relations (explained during presentation) from which it can clearly determine the sum of time constants and after that also parameters for the transfer (a) but not exactly.

\[
S_2(s) = \frac{K}{(T_1s+1)(T_2s+1)}; \quad T_1 > T_2; \quad 0 < \tau_2 = \frac{T_2}{T_1} < 1; \quad (T_1 + T_2) = const
\]

Example: a) \( T_1 = 9, \ T_2 = 1; \quad \tau_2 = 0.1111; \)  b) \( T_1 = 5.5, \ T_2 = 4.5; \quad \tau_2 = 0.8181 \)
\[ S_1(s) = \frac{K}{(T_1 s + 1)}; \quad (T_1 + T_2) = const; \quad \tau_2 = \frac{T_2}{T_1} = 0, \quad \Rightarrow \quad S_1(s) = S_2(s) \quad (2) \]

\[ S_{1,T}(s) = \frac{K}{(T_1 s + 1)}; \quad (T_1 + T_2) = const; \quad \tau_2 = \frac{T_2}{T_1} = 1, \quad \Rightarrow \quad S_{1,T}(s) = S_2(s) \quad (3) \]

The gain \( K \) is not a problem from the transient characteristic to identify (but not exactly, especially by real time measurement - see presentation). Precisely can be constant \( t_2 \) calculated by the iteration of transcendental equation, which was by author derived from Strejc’s method. Even after improvement the calculation of \( t_2 \), time constants is not precise, because Strejc's assumption of a single intersection for all transient characteristics is not exactly true.

The correct procedure for calculating of time constant, which obtains two or three iteration procedure, will be explained in the presentation. By measuring the accuracy depends also from the experiment in which with smaller interval of sampling will achieve greater accuracy, by the A/D converters, the size of noise, the filtering algorithm and so on.

Identification Of Predictive Time Constant: This part explained how it can be with identification detect time constant \( T_r \) in the type of transfers functions (4). It would seem possible to identify this time constant with analysis of the transient function, but the task for which we need to identify this time constant is not only the measuring of transient response. The task is to search parameters of the model, which can describe the measured dynamics between the eyes – hands and eyes - feet of the driver, which control the car. For a description of this dynamics, models (4) are used, and in the last of them "prediction time constant \( T_r \)" is included. It is a result from the interaction dynamics of neuromuscular system and predictions in the brain [2], [6]. After the "correct" identification of models, the parameters in the models (14) (excluding time delay "D") are changeable in time. In the common transformation of \( S(s) \to S(z) \) is parameter \( b_0 = 0. \) In the measurement process \( b_0 \neq 0 \) respect noise in the A/D or D/A converter in the zero initial conditions.

\[ S(s) = \frac{K * e^{-\rho s}}{T^2 * s^2 + 2aT * s + 1}, \quad a<1; \quad S(s) = \frac{K * e^{-\rho s}}{(T_1 * s + 1)(T_2 * s + 1)}, \quad a \geq 1; \quad S(s) = \frac{K(T_1 * s + 1) * e^{-\rho s}}{T^2 * s^2 + 2aT * s + 1}, \quad a < 1 \text{ or } a \geq 1 \quad (4) \]

\[ S(z) = \frac{b_0 + b_1 * z^{-1} + b_2 * z^{-2}}{1 + a_1 * z^{-1} + a_2 * z^{-2}}, \quad D_0 = \text{int}(D/T_0) \quad (5) \]

The derivation of relationships for determining the predictive time constants is based on a comparison of discrete and continuous transients, will be explained during presentation.

Further research in this area is focused on the identification of changeable transport delays for the models of dynamics system of driver's and car.

Acknowledgment

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References
Speaker’s Biography

Mikuláš Alexík is a professor in Information and Control Techniques at the Technical Cybernetics department, University of Zilina, Slovak Republic. After finishing secondary school he continued 3 years at the apprentice school for “universal turner” and one year as the worker in the factory Víhorlat Snina. Then he continued 4 years at the secondary technical school. Next five years studied at the Slovak Technical University in Bratislava and finished it in 1970 with a Masters degree in “Automation”. He received his PhD degree in Technical Cybernetics at the Slovak Technical University, Bratislava, in 1980 in “Hybrid Simulation of Train Control”. In 1985 he obtained habilitation degree in “Technical Cybernetics” in the University of Zilina (formerly University of Transport and Communication in Zilina).

In 1997 he took inauguration hearing and obtained full professor position in “Information and Control Techniques” at the department of Technical Cybernetics in the same university. His research interests include Adaptive and Self Tuning Control Algorithm, Identification of Parameters in Dynamics Processes, modelling and simulation of transportation means and processes and modelling and identification of the driver dynamics behaviours in the car. He has worked for a long time in national and international boards and societies (Slovak Society for Applied Cybernetics and Informatics, Czech and Slovak Simulation Society, European Coordination Committee for Artificial Intelligence, IFAC Technical Committee and EUROSIM). He is a member of editorial boards in several journals in Slovak and Czech Republic (Automation - Theory and Praxis, Cybernetics and Informatics, EDIS - Zilina University Publisher, Cybernetics Letters), and in the international Journals (Simulation News Europe – News section, SIMPRA – Simulation Modelling Practice and Theory until 2010). He was an IPC member of numerous Conferences and congresses in the area of “Modelling and Simulation of Systems”. From the 1993 he was a member of EUROSIM Board and in the period 2007-2010 he was the EUROSIM President. Presently he continues as member of EUROSIM Board.
Tutorial-3

Cyber Security: The Importance of CERTs
(Computer Emergency Response Teams)

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Keywords: Cyberspace, Human Development and Security, Pacific Computer Emergency Response team (PacCERT), Japan Pacific ICT Centre, Governance, Privacy, globalization, IT Age, Next Generation Internet.

Abstract: The current and future dynamic development and innovation in the field of Information Communications Technologies (ICT) create a platform for the ubiquitous connectivity via Cyberspace for anywhere at any time for anyone worldwide. Having millions of people all over the planet, connected to the Internet via his/her PC, laptop, or any portable mobile device create opportunities for communication all kind of information and content which may or may not be always contributing to the betterment of mankind.

Among thousands of different interest groups and social networks in countries worldwide, there are also groups that may wish to create, distribute or promote the information that may put state security, national economy and society in danger. Given the current complexity of the Internet and the ICT hardware and software infrastructures, in conjunction with the human factor, establish four basic categories that may trigger malfunction of the Internet and ultimately a cyberspace worldwide. These categories are:

1) Hardware:
   a. Connectivity;
   b. Reliability;

2) Software:
   a. Malware and spams;
   b. Configuration;
   c. Interoperability;

3) Human factor:
   a. Terrorist driven attack(s);
   b. Politically and Economically driven attack(s);
   c. War(s), etc.;

4) Natural disasters:
   a. Flooding;
   b. Earthquake(s);
   c. Volcanic explosion(s), etc.;

All across the globe, there are many professional groups of experts working together to make sure that the Internet and ICT function properly. There number of the Computer Emergency Response Teams (CERTs) that operate and cover a specific region on the planet, such as Australian CERT [1], Japanese CERT [2], US CERT [3], APCERT [4] and PacCERT [5]. The regional CERTs coordinate and monitor the Internet in collaboration with the regional network service providers, security vendors, government agencies, as well as the industry associations.

The author worked as a Chair of the Pacific CERT and First Director of Japan Pacific ICT Centre and will discuss the importance of CERT in the South Pacific Region as an essential part of the Global Internet and Cyberspace Infrastructure. Many member countries in the south pacific region do not have access to Internet and local ICT infrastructures with necessary strategic tools to address their socio-economic issues.

References:
Speaker’s Biography

Professor Babulak is an accomplished international scholar, researcher, consultant, educator, professional engineer and polyglot.

- Keynote Speaker at the International Conference on Communication Systems and Network Technologies, 2011 (CSNT-2011), organized by SMVDU, Katra, (J&K) and MRI Labs, Katra, Jammu, India,
- Plenary Keynote Speaker at the International Conference on Advances in Computing and Communications 2011 (ACC-2011), in Kochi, India;
- Invited Panel Speaker at the ITU Kaleidoscope Conference, Dec. 2010 in Pune, India;
- Invited Speaker at the University of Cambridge, UK, March 2010 and March 2009;
- Panel Speaker at the KIZUNA WINDS Symposium Tokyo Feb 2010;
- Invited Speaker at National University of Yokohama and University of Electro-Communications in Tokyo, December 2009;
- Invited Panel Chair and Speaker at MIT, USA, May 2010 and September 2005;
- Fellow of the Royal Society for the encouragement of Arts, Manufactures and Commerce (FRSA),
- Chartered Fellow of British Computer Society (FBCS),
- Senior Member of ACM, Mentor and Senior Member of IEEE,
- served as a Chair of the IEEE Vancouver Ethics, Professional and Conference Committee.
- His academic and engineering work is recognized internationally by the Engineering Council in UK, European Federation of Engineers and credited by the British Columbia and Ontario Society of Professional Engineers in Canada.
- Professor Babulak speaks 14 languages, a member of the Institution of Engineering Technology (MIET), American Society for Engineering Education (MASEE), American Mathematical Association (MAMA) and Mathematical Society of America (MMSA).
- His biography is cited in the Cambridge Blue Book, Cambridge Index of Biographies and number of issues of Who's Who.
Laura, a very beautiful but also mysterious lady, inspired the famous poet Francesco Petrarca for poems, which express ecstatic love as well as deep despair. F. J. Jones – a scientist for literary - recognised in these changes between love and despair in the years 1328 to 1350 an oscillating behaviour, which he called Petrarch’s emotional cycle, measured by individuals ‘grades’ for the poems (enthusiastic hope ~ +1, deep despair ~ - 1). It is evident, that this cycle is based on the emotional relations between Laura and Petrarch and on Petrarch’s inspiration.

The mathematician S. Rinaldi investigated as first Petrarch’s emotional cycle and established a mathematical model based on ordinary differential equation of predator-prey type: two coupled ODEs with nonlinear reaction functions, reflecting Laura’s and Petrarch’s emotion for each other, drive an inspiration variable. Rinaldi’s ODE model for Laura’s and Petrarch’s emotions were starting point for the Laura Group at Vienna University of Technology to investigate in two directions: mapping the mathematical model to a suitable modelling concept, and trying to extend the model for love dynamics in modern times.

The modelling concept of System Dynamics fits very well to model the qualitative behaviour. In principle, emotions and inspiration emerge from a source, and are fading into a sink. But the controlling parameters for increase and decrease of emotion create a broad variety of emotional behaviour and of degree of inspiration, because of the nonlinearities.

Emotions and inspiration are fading over time – behaving like a transfer function approaching a steady state. This observation suggests a modelling approach by transfer functions. Emotions and inspiration are modelled by first order lags driven by the other’s emotion and by inspiration as inputs.

Both approaches make the basic modelling easy, but for nonlinear influences the nonlinear reaction functions must be used. For construction of these functions as well as for identification of model parameters Petrarca’s sonnets are a valuable source in qualitative and quantitative analysis, so that Jones’ emotional cycle can be retraced by the model. But simulation experiments also allow interesting ‘what-if’ analysis in history: what, if Petrarch would have been more attractive? - what, if Laura would have left her husband and would have married Petrarch?

In times of gender equality woman as well as men may play an active part in a love affair. Consequently also women express their love by poems or other media, and they confess their love to public. For Laura and Petrarch this would mean, that also Laura writes poems, that Petrarch’s appeal is influenced by Laura’s poetic inspiration, and that Petrarch shows more sensibility in his reaction to Laura. By this, the Laura-Petrarch model develops to a Woman-Man – model, expressed by ODEs, stock-flow diagram or transfer functions – and interesting possibilities for simulation experiments.

This UKSim2011 Special Presentation gives an overview of the historical background inspiring the audience by Renaissance music and citation of Petrarca’s sonnets to Laura, sketches the modelling techniques for emotional states.
and invites the audience to help in model development by grading the cited sonnets – with an remarkable conclusion about the best model for (Laura’s and Petrarch’s) emotions.

Laura Group- Vienna University of Technology: Aman Atri, Felix Breitenecker, Katharina Breitenecker, Florian Judex, Andreas Körner, Anna Mathe, Andy Mathe, Nicole Nagele, Nikolas Popper, Shabnam Tauböck, Siegfried Wassertheurer

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Presenters at UKSIM 2011, Cambridge: Nicole Nagele, Felix Breitenecker

| Amor con sue promesse lunsingando, mi ricondusse alla prigione antica | Love's promises so softly flattering me have led me back to my old prison's thrall | It's time indeed to die, and I have lingered more than I desire. | Tempo e ben di morire, et o tardato piu ch'i non vorrei. |