



## **Preface of the "Symposium on new methods for modeling and control of flexible structures and robots"**

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# Preface of the “Symposium on New Methods for Modeling and Control of Flexible Structures and Robots”

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The flexible structures and robots are necessary and/or indispensable in:

1. winding and/or very cramped workspaces (where less invasive robots, and therefore with slender links, are required);
2. very wide workspaces or anyway robots with end-effectors very far from their bases, because of the presence of obstacles (rivers, buildings, etc.), or when it is impossible or not convenient to use robots with mobile base or more cooperative robots (e.g. to build and/or to maintain mega-structures, electric lines, etc.);
3. dangerous and/or harmful areas of work both for the human operators and for the actuators with the electronic control (rescue and security robots).

For these reasons the modeling and control of robots with flexible links and, more generally, of flexible structures with degrees of freedom, has been a historic topic of research and it remains very interesting and significant for the scientific and engineering community. Nowadays, in fact, in the above mentioned cases higher and higher specifications are required in terms of operating speeds and/or amplitude of areas of work and security; the only way to satisfy the previous specifications is to reduce the mass and to make the structures slender, i.e. to employ articulated structures having flexibility properties. Obviously, in order to reduce the disadvantages due to flexibility (oscillations and/or vibrations, breaking and the spillover phenomenon when the structure is controlled by a closed-loop controller), it is necessary to design advanced control systems based on reliable and efficient models.

This Symposium collects several multidisciplinary contributions in the automatic, mechanical, civil, aeronautical and naval sectors giving some significant answers to the above complex matters which remain still open.

## Dr. Laura Celentano



Laura Celentano is currently Assistant Professor of Automatic Control in the “Dipartimento di Ingegneria Elettrica e delle Tecnologie dell'Informazione” at the Università degli Studi di Napoli Federico II and she has been Professor of “Fundamentals of dynamic systems”, “Modeling and simulation” and “Automation of navigation systems” since 2006.

She has been effectively involved in activities co-funded by the European Union, the Italian Ministry of University and Research, the Italian Ministry of Economic Development, Region Campania, public and/or private corporations and industries.

She is an author/reviewer for IEEE, ASME and ELSEVIER journals and conferences. She has been Chair of IEEE conferences’ sessions.

She is the author and co-author of scientific and educational books.

She cooperates with radio programs and Italian journals on the popularization of scientific matters.

Her main research interests and activities are in design of versatile, fast, precise and robust control systems of linear and nonlinear uncertain systems, methods for the analysis of stability and for the stabilization of linear and nonlinear uncertain systems (also MIMO and discrete-time systems), modeling and control of rigid and flexible mechanical systems, multi-valued control design methodologies, modeling and control of aeronautical, naval and structural systems, rescue and security robotics, telemonitoring and/or telecontrol systems, and advanced human machine interfaces.

Her personal contributions to these subjects have a theoretical and/or didactic and/or applicative and/or project nature.