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Article:

Bonney, M. orcid.org/0000-0002-1499-0848, Vizzaccaro, A. and Wagg, D. orcid.org/0000-0002-7266-2105 (2023) Preface to special issue on 'Digital twin applications'. Mechanical Systems and Signal Processing, 186. 109882. ISSN 0888-3270

<https://doi.org/10.1016/j.ymssp.2022.109882>

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Preface

The aim of this special issue is to provide insights into digital twins for engineering systems. Digital twins are a rapidly developing area of technology that are affecting many aspects of engineering research. They naturally align to time evolving systems, and so fit with a dynamics, control and uncertainty analysis framework. A further aim of this issue is to explore the inter-relation of these very important and interlinking aspects of digital twin research. The time evolving nature of the digital twin concept leads naturally to dynamics. Furthermore, the interactive nature of the digital twin has a strong intersection with process control and other control related topics. In addition, the recent growth in data-based modelling, machine learning and uncertainty modelling has provided a new set of tools that can be exploited in the digital twin domain.

Digital twins are a highly versatile concept that can be applied to a wide range of scenarios, and as a result the contributions to this special issue reflect that.

This issue covers topics that include; how to construct digital twins; dealing with data sets, machine learning and data based modelling for digital twins; digital connectivity, internet-of-things and hardware aspects of digital twins; control methods for digital twin; the interaction of digital and physical twin; real-time related topics, including sensors & actuators, software and control topics; uncertainty analysis for digital twin; verification and validation methods; health monitoring, and asset management digital twins. We would particularly welcome papers that include experimental results, or data from real-worlds engineering examples. The intersection of these domains is highly multidisciplinary, leading to an exciting cross-fertilisation of new ideas.

Many of the papers in this issue were contributed by researchers from the DigiTwin project, and we would like to acknowledge the support of the Engineering & Physical Sciences Research Council. We would also like to thank the editors from Elsevier who gave us invaluable help in the preparation of this issue.

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Guest Editors.

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Accepted papers (in order of appearance in the special issue):

1. Blah

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