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# *Working Papers*



*The Sixth International Workshop on  
Qualitative Reasoning about  
Physical Systems*

*24-27th August 1992,  
Intelligent Automation Laboratory  
Heriot-Watt University,  
Edinburgh, Scotland*

*Roy Leitch, Chair*



# **Working Papers**

## **QR'92**

### **Sixth International Workshop on Qualitative Reasoning about Physical Systems**

Programme Committee:

Roy Leitch, Chair  
Bert Bredeweg  
Tony Cohn  
Leo Joskowicz  
Ben Kuipers  
Dan Weld

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Intelligent Automation Laboratory  
Department of Computing and Electrical Engineering  
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# Preface

Qualitative Reasoning is still comparatively young. Although work on the qualitative reasoning about the properties of physical systems began around the late seventies it has only been within the last 6-8 years that this research activity has dramatically expanded, both in terms of theoretical developments and in its impact on other disciplines. That this has occurred is demonstrated by the immense interest in QR currently being shown by researchers from many diverse disciplines, and also by the claim that they too are doing 'qualitative reasoning', when in fact often they are not, at least not corresponding to the techniques developed within this community. This highlights what I consider to be an urgent problem. We must discern the principles and motivations behind our work so that we can determine common ground and hence begin to establish a coherent framework for research. Only by developing such a framework can we compare the relative merits of the various approaches to QR and indeed, the merits of QR with respect to other AI, and even non-AI based techniques for representing and reasoning about physical systems.

Within the last few years some people have become increasingly sceptical about the success of QR. They point to the lack of real application systems and suggest that the whole pursuit may be futile. In my experience, such people tend not to appreciate the fundamental motivations and insights behind the development of QR. Rather they continue to use numerical approaches as the yardstick by which to measure success. For our part, we in the QR community must make a better job of clarifying and describing our motivations and less time extolling the virtues of our particular algorithms. Only by clearly characterising what we are trying to do can we claim success; otherwise, we can always be considered to have failed. But what about the lack of real applications? In my view such criticisms are premature. If we consider that the development time for conventional numerical approaches has been in the order of decades, and that one definition of qualitative is 'non-numerical', then even 10 years of development of such an ambitious enterprise is too short to expect successful application systems. Further, the technology transfer process from concept proving in the laboratory to industrial applications is generally regarded to take between 5-10 years. This is about the same duration as the existence of the QR discipline! Of course, this is not to say that we should not be pursuing practical applications whenever possible; as an Engineer this is my ultimate goal. However, we must also be patient and not promise what we cannot yet reasonably deliver.

Steady progress in developing our discipline is apparent, however. Only by looking back can we measure the distance travelled. The contributions represented at this workshop attest to the health and vitality of the field. With some introspection and consolidation Qualitative Reasoning is poised to take its rightful place amongst the arsenal of techniques available for representing and reasoning about the behaviour of physical systems.

Many people have contributed to the organisation and preparation for this workshop. I am extremely grateful to the Programme Committee for the benefit of their advice on major decisions and for coping with the heavy reviewing burden placed on them, and their colleagues, over such a short period of time. Thanks are due to the following people who served as reviewers for the workshop: Franz Amador, Tony Barrett, Bert Bredeweg, George Coghill, Tony Cohn, Leo Joskowicz, Benjamin Kuipers, Roy Leitch, Dorothy Neville, Qiang Shen, Peter Struss, Dan Weld, Mark Wiegand.

The workshop would not be taking place without the support and hard work undertaken by a local organising committee consisting of George Coghill, Qiang Shen and Mark Wiegand. Essentially, they have delivered the arrangements for the accommodation, programme and social events, respectively. These tasks being completed in the midst of moving location and forming a new department. Thanks, I am very grateful.

Also, behind the scenes lies a great deal of efficient secretarial support provided by Gillian Duffy and Linda Purves. An additional burden was placed on them by the loss of e-mail contact during the move to new premises. This was cheerfully taken in their stride.

And so, everything seems set to continue the successful series of Qualitative Reasoning workshops. I'm looking forward to the stimulating presentations and discussions, but even more to the boring silence when its all over, at least for a while.

Roy Leitch  
Edinburgh, Scotland  
14th August, 1992