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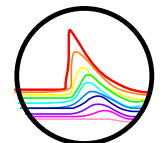
# Experiments for Code Validation

**James K. Gran**  
SRI International  
Menlo Park, CA

Presented at  
**1999 ASME International  
Mechanical Engineering Congress & Exposition**

**USACM ad hoc Committee on  
Verification and Validation  
Of Computer Codes in Solid Mechanics**

**Nashville, TN  
14 November 1999**



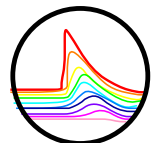


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# Essential Components of Code Validation Experiments

- **Geometry**
- **Material Properties**
- **Loads**
- **Response**



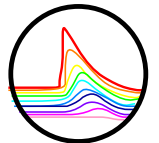


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# Desirable Attributes of Code Validation Experiments

- **Quality Control**
- **Repeatability**
- **Parameter Variation**
- **Accurate Measurements**



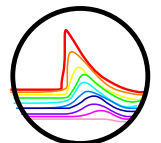


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# Measurements of Code Validation Experiments

- **Global and Local Measurements**
- **Fits of Fields**
- **Redundancy**
- **Independent Measurements**
- **Uncertainty Estimates**
- **Limitations of Gauges**



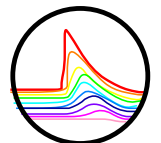


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# Design of Experiments For Code Validation

- **Symmetry**
- **Simplicity of Boundary Conditions**
- **Add Complexity in Stages**
- **Communication with Modelers**





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# Conclusions on Code Validation Experiments

- **Experiments should be part of the code validation strategy--don't rely only on data from the literature.**
- **Modelers should contribute to the designs of validation experiments.**

