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Nota di contenuto	Cover; Title Page; Contents; Preface; Chapter 1. Industrial Challenges Where Computational Welding Mechanics Becomes an Engineering Tool; 1.1. Reducing the risk of weld cracking; 1.1.1. Implant test modeling for risk of cold cracking assessment during welding operations; 1.1.2. PWHT and temper bead processes; 1.1.3. Validation of residual stress prediction on a temper bead mock-up; 1.2. Welding and distortion issues; 1.2.1. Local shrinkage prediction; 1.2.2. Global distortions; 1.3. Integrity assessment of welded structures; 1.3.1. DMW junction 1.3.2. Ductile tearing prediction in welds considering hydrogen embrittlement 1.4. Bibliography; Chapter 2. Laser and Electron Beam Welding of 6xxx Series Aluminum Alloys - On Some Thermal, Mechanical and Metallurgical Aspects; 2.1. Introduction; 2.2. Literature review; 2.2.1. Modeling and simulation of welding - a historical perspective; 2.2.2. Thermometallomechanical modeling; 2.2.3. Material properties; 2.2.4. Heat source modeling and boundary conditions; 2.2.5. Welding consequences; 2.3. Laser beam welding of AA 6056-T4 plates; 2.3.1. Research title; 2.3.2. Problem statement 2.3.3. Strategy 2.3.4. Experimental work; 2.3.5. Numerical simulation; 2.3.6. Results and discussion; 2.3.7. Special cases; 2.3.8. Conclusions; 2.4. Electron beam welding of AA 6061-T6 plates; 2.4.1. Research title;

2.4.2. Problem statement; 2.4.3. Strategy; 2.4.4. Numerical simulation - heat transfer analysis of EBW; 2.4.5. Thermomechanical characterization; 2.4.6. Metallurgy of aluminum alloys; 2.4.7. Findings of thermomechanical characterization; 2.4.8. Special cases; 2.4.9. Phenomenological model; 2.4.10. Conclusions; 2.5. Bibliography
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5.2. Continuum thermodynamics framework for lattice diffusion

Sommario/riassunto

The numerical simulation of manufacturing processes and of their mechanical consequences is of growing interest in industry. However, such simulations need the modeling of couplings between several physical phenomena such as heat transfer, material transformations and solid or fluid mechanics, as well as to be adapted to numerical methodologies. This book gathers a state of the art on how to simulate industrial processes, what data are needed and what numerical simulation can bring. Assembling processes such as welding and friction stir welding, material removal processes, elaboration proce
