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ENERGY; 4.5 IRREVERSIBILITY; 4.6 GRAPHICAL REPRESENTATION OF AVAILABLE ENERGY AND IRREVERSIBILITY; 4.7 AVAILABILITY BALANCE FOR A CLOSED SYSTEM; 4.8 AVAILABILITY BALANCE FOR AN OPEN SYSTEM; 4.9 EXERGY; 4.10 THE VARIATION OF FLOW EXERGY FOR A PERFECT GAS; 4.11 CONCLUDING REMARKS; 4.12 PROBLEMS; CHAPTER 5 - RATIONAL EFFICIENCY OF POWER PLANT; 5.1 THE INFLUENCE OF FUEL PROPERTIES ON THERMAL EFFICIENCY; 5.2 RATIONAL EFFICIENCY; 5.3 RANKINE CYCLE; 5.4 EXAMPLES 5.5 CONCLUDING REMARKS 5.6 PROBLEMS; CHAPTER 6 - FINITE TIME (OR ENDOREVERSIBLE) THERMODYNAMICS; 6.1 GENERAL CONSIDERATIONS; 6.2 EFFICIENCY AT MAXIMUM POWER; 6.3 EFFICIENCY OF COMBINED CYCLE INTERNALLY REVERSIBLE HEAT ENGINES WHEN PRODUCING MAXIMUM POWER OUTPUT; 6.4 PRACTICAL SITUATIONS; 6.5 MORE COMPLEX EXAMPLE OF THE USE OF FTT; 6.6 CONCLUDING REMARKS; 6.7 PROBLEMS; CHAPTER 7 - GENERAL THERMODYNAMIC RELATIONSHIPS: FOR SINGLE COMPONENT SYSTEMS OR SYSTEMS OF CONSTANT COMPOSITION; 7.1 THE MAXWELL RELATIONSHIPS; 7.2 USES OF THE THERMODYNAMIC RELATIONSHIPS; 7.3 TDS RELATIONSHIPS 7.4 RELATIONSHIPS BETWEEN SPECIFIC HEAT CAPACITIES 7.5 THE CLAUSIUS-CLAPEYRON EQUATION; 7.6 CONCLUDING REMARKS; 7.7 PROBLEMS; CHAPTER 8 - EQUATIONS OF STATE; 8.1 IDEAL GAS LAW; 8.2 VAN DER WAALS EQUATION OF STATE; PROBLEM; 8.3 LAW OF CORRESPONDING STATES; 8.4 ISOTHERMS OR ISOBARS IN THE TWO-PHASE REGION; 8.5 CONCLUDING REMARKS; 8.6 PROBLEMS; CHAPTER 9 - THERMODYNAMIC PROPERTIES OF IDEAL GASES AND IDEAL GAS MIXTURES OF CONSTANT COMPOSITION; 9.1 MOLECULAR WEIGHTS; 9.2 STATE EQUATION FOR IDEAL GASES; 9.3 TABLES OF $U(T)$ AND $H(T)$ AGAINST T ; 9.4 MIXTURES OF IDEAL GASES; 9.5 ENTROPY OF MIXTURES 9.6 CONCLUDING REMARKS

Sommario/riassunto

Advanced Thermodynamics for Engineers, Second Edition introduces the basic concepts of thermodynamics and applies them to a wide range of technologies. Authors Desmond Winterbone and Ali Turan also include a detailed study of combustion to show how the chemical energy in a fuel is converted into thermal energy and emissions; analyze fuel cells to give an understanding of the direct conversion of chemical energy to electrical power; and provide a study of property relationships to enable more sophisticated analyses to be made of irreversible thermodynamics, allowing for new ways of efficiently