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Autore	Torenbeek Egbert
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Optimization Problem; 1.7.1 Analysis Versus Synthesis; 1.7.2 Problem Classification; Bibliography; 2 Early Conceptual Design; 2.1 Scenario and Requirements; 2.1.1 What Drives a Design?; 2.1.2 Civil Airplane Categories; 2.1.3 Top Level Requirements; 2.2 Weight Terminology and Prediction; 2.2.1 Method Classification
2.2.2 Basic Weight Components 2.2.3 Weight Limits; 2.2.4 Transport Capability; 2.3 The Unity Equation; 2.3.1 Mission Fuel; 2.3.2 Empty Weight; 2.3.3 Design Weights; 2.4 Range Parameter; 2.4.1 Aerodynamic Efficiency; 2.4.2 Specific Fuel Consumption and Overall Efficiency; 2.4.3 Best Cruise Speed; 2.5 Environmental Issues; 2.5.1 Energy and Payload Fuel Efficiency; 2.5.2 'Greener by Design'; Bibliography; 3 Propulsion and Engine Technology; 3.1 Propulsion Leading the Way; 3.2 Basic Concepts of Jet Propulsion; 3.2.1 Turbojet Thrust; 3.2.2 Turbofan Thrust; 3.2.3 Specific Fuel Consumption
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4.5.2 Roughness and Excrescences

Sommario/riassunto

Although the overall appearance of modern airliners has not changed a lot since the introduction of jetliners in the 1950's, their safety, efficiency and environmental friendliness have improved considerably. Main contributors to this have been gas turbine engine technology, advanced materials, computational aerodynamics, advanced structural analysis and on-board systems. Since aircraft design became a highly multidisciplinary activity, the development of multidisciplinary optimization (MDO) has become a popular new discipline. Despite this, the application of MDO during the conceptual desig