

SUMMARIES REZIMEI

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LARGE ENGINE TURBOCHARGING SIMULATION: THE ROLE, STATE OF THE ART, AND DEVELOPMENT TRENDS

UDC: 621.43.052:681.3.06

Abstract:

Surveyed in the paper is the field of large engine (more than approx. 500 kW engine power per turbocharger unit) turbocharging simulation. Turbocharging, almost from the beginning an inherent part of large Diesel engines, is now seen as a decisive technology to bring about better fuel economy, smaller engines, and reduction of emissions in all areas of internal combustion engine application. A short history of turbocharging is given, and its present role in both the large and small engine sectors highlighted. Simulation, as a well proven way towards reducing development costs in the pursuit of the above goals, has been for decades realised by means of software tools. Requirements posed to the simulation software are analysed, and the major software suites on the market surveyed. It is concluded that although turbocharging simulation represents a mature technology, the ever increasing demands for simulation accuracy make further research necessary. The main development trends are discussed, and areas where further research is required identified.

Keywords: Turbocharging, Simulation, Diesel Engines, Gas Engines, Software.

SIMULACIJA TURBOPUNJENJA VELIKIH MOTORA: ULOGA, AKTUELNI STATUS I RAZVOJNI TRENDVI

U radu je izložen pregled oblasti simulacije turbopunjenja velikih motora (više od 500 kW po turbopunjaču). Turbopunjenje, koje je od početka razvoja Dizel-motora bilo njihov nerazdvojni deo, danas se smatra odlučujućom tehnologijom koja treba da doprinese smanjenju potrošnje goriva, veličine mašina i emisije štetnih gasova u svim oblastima primene motora SUS. Na početku rada predstavljena je kratka istorija turbopunjenja, kao i njena uloga u sektorima velikih i malih motora. Simulacija, kao oprobani metod za smanjenje razvojnih troškova u postizanju prethodno navedenih ciljeva, vrši se već nekoliko decenija pomoću softverskih alatki. Analiziraju se zahtevi koje simulacioni softver treba da ispuni i daje se pregled najpoznatijih softverskih paketa u ovoj oblasti. Na osnovu te analize dolazi se do zaključka da iako simulacija turbopunjenja danas predstavlja zrelu tehnologiju, stalno pooštavanje zahteva za što bolju tačnost rezultata stvara potrebu za daljim istraživanjima. Rad se završava diskusijom aktuelnih trendova razvoja simulacionog softvera i identifikacijom oblasti u kojima su neophodna dalja istraživanja.

Cljučne reči: Turbopunjenje, Simulacija, Dizel-motori, Gasni motori, Softver.