PACKAGE ID - 000550IBMPC00 MARVEL

KWIC TITLE - Battery/Heat Engine Vehicle Analysis

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LIMITATION CODE -UNL **AUDIENCE CODE -** UNL

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DESCRIPTION - MARVEL performs least-life-cycle-cost analyses of battery/heat engine/hybrid vehicle systems to determine the combination of battery and heat engine characteristics for different vehicle types and missions. Simplified models are used for the transmission, motor/generator, controller, and other vehicle components, while a rather comprehensive model is used for the battery. Battery relationships available include the Ragone curve, peak power versus specific energy and depth-of-discharge (DOD), cycle life versus DOD, effects of battery scale, and capacity recuperation due to intermittent driving patterns. Energy management in the operation of the vehicle is based on the specified mission requirements, type and size of the battery, allowable DOD, size of the heat engine, and the management strategy employed. Several optional management strategies are available in MARVEL. The program can be used to analyze a pure electric vehicle, a pure heat engine vehicle, or a hybrid vehicle that employs batteries as well as a heat engine. Cost comparisons for these vehicles can be made on the same basis. Input data for MARVEL are contained in three files generated by the user using three preprocessors which are included. MVDATA processes vehicle specification and mission requirements information, while MBDATA creates a file containing specific peak power as a function of specific energy and DOD, and MPDATA produces the file containing vehicle velocity specification data based on driving cycle information.

PACKAGE CONTENTS - NESC Note; Media Directory; Software Abstract; Media Includes Source, Object, Executable, Sample Problem, Auxiliary Routines, Auxiliary Information and Control Information;

SOURCE CODE INCLUDED? - Yes

MEDIA QUANTITY - 1 3.5 Diskette

METHOD OF SOLUTION - The heat engine performance model is based on engineering data for a 1.8-liter production engine. The instantaneous road-load power requirement is calculated from the resultant force that overcomes the drag force, rolling resistance, and effects of grade, at the same time propelling the vehicle at a

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METHOD OF SOLUTION -(CONT) specified speed and acceleration. A series/parallel configuration is simulated for the hybrid vehicle system.

COMPUTER - IBM PC

OPERATING SYSTEMS - DOS

PROGRAMMING LANGUAGES - PL/I

SOFTWARE LIMITATIONS - Maximum of 9 periods per driving cycle.

SOURCE CODE AVAILABLE (Y/N) - Y

RELATED SOFTWARE - MARVEL is an extension of the earlier EVA and HELEN computer programs. It combines all the features of EVA, the electric vehicle analysis model, and HELEN, the electric/hybrid vehicle analysis model.

HARDWARE REQS - A minimum of 128 Kbytes of memory is required.

TIME REQUIREMENTS - The sample problem requires approximately 3 minutes.

REFERENCES - MARVEL, NESC No. 9508, MARVEL Flexible Disk Cartridge Directory, National Energy Software Center Note 91-46, Revised March 21, 1991.

ABSTRACT STATUS - Abstract first distributed March 1991. IBM PC version submitted January 1989 and March 1991.

SUBJECT CLASS CODE - T

KEYWORDS -
COMPUTER PROGRAM DOCUMENTATION
M CODES
LIFE-CYCLE COST
HYBRID ELECTRIC-POWERED VEHICLES

EDB SUBJECT CATEGORIES -
990200 330400 330300

SPONSOR - DOE/CE

PACKAGE TYPE - AS - IS