

PACKAGE ID - 001173IBMPC00 LOOP4

KWIC TITLE - Real Time Optimizing Code for Stabilization
and Control of Plasma Reactors

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LIMITATION CODE -COPY **AUDIENCE CODE** - LIM

COMPLETION DATE - 12/01/1994 **PUBLICATION DATE** - 12/01/1994

DESCRIPTION - LOOP4 is a flexible real-time control code that acquires signals (input variables) from an array of sensors, that computes therefrom the actual state of the reactor system, that compares the actual state to the desired state (a goal), and that commands changes to reactor controls (output, or manipulated variables) in order to minimize the difference between the actual state of the reactor and the desired state. The difference between actual and desired states is quantified in terms of a distance metric in the space defined by the sensor measurements. The desired state of the reactor is specified in terms of target values of sensor readings that were obtained previously during development and optimization of a process engineer using conventional techniques.

PACKAGE CONTENTS - Media directory; Software Abstract; Media Includes Source Code, Executable Module, Object Module;

SOURCE CODE INCLUDED? - Yes

MEDIA QUANTITY - 1 3.5 Diskette

METHOD OF SOLUTION - The software includes a variety of standard mathematical techniques, including optimization by the downhill simplex method, line minimization, linear interpolation and extrapolation, and distance-weighted multidimensional interpolation.

COMPUTER - IBM PC

OPERATING SYSTEMS - MS DOS 3.0 or later

PROGRAMMING LANGUAGES - C

SOFTWARE LIMITATIONS - The process data file is a single two-dimensional double-precision array whose size depends on the number of controls and processes to be addressed. Either the memory model must accomodate the size of the array, or the array must be broken down into an array of vectors.

SOURCE CODE AVAILABLE (Y/N) - Y

UNIQUE FEATURES - The code could be used to control other complex systems in addition to plasma reactors. We are not aware of any

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UNIQUE FEATURES - (CONT) competing control codes that perform the same functions.

RELATED SOFTWARE - The code must communicate with and control devices for input and output. The present version controls a data acquisition board and software from National Instruments and control stepping motors from Parker. If different sensor or control systems are to be used with the code, appropriate customization must be performed.

OTHER PROG/OPER SYS INFO - The source code is named LOOP4.c, the object file is LOOP4.obj, and the executable file is LOOP4.exe. Software from National Instruments is linked to the code in order to control the data acquisition board. The software has been compiled and linked using Microsoft Quick-C.

HARDWARE REQS - The code has no special computer hardware requirements. The source code is approximately 2000 lines long. It has been compiled, linked, and operated successfully with a 33-MHz 486 processor, 4 Mbytes total of DRAM, and 589 Kbytes of base memory. The executable file is less than 200 kbytes in size.

TIME REQUIREMENTS - The code operates interactively with an operator. Typically, the code controls a reactor for periods of time from several seconds to hours, depending on how long the reactor is to be operated.

ABSTRACT STATUS - Submitted 8/7/97. Release AS-IS 10/27/97

SUBJECT CLASS CODE - T

KEYWORDS -

COMPUTER PROGRAM DOCUMENTATION
L CODES
CONTROL SYSTEMS
PLASMA
PROCESS CONTROL

EDB SUBJECT CATEGORIES -
990200

SPONSOR - DOE/DP

PACKAGE TYPE - AS - IS