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Harry Prosper

MEMBER 2MLR3

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JADE NOTE XX
DECEMBER 1979
DESCRIPTION OF PHILOSOPHY (3) MUON FILTER TRACKS PATTERN RECOGNITION
PROGRAM 'TRACK', DEVELOPED AND WRITTEN BY HARRISON B. PROSPER
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THE LIBRARIES CONTAINING THE APPROPRIATE PROGRAMS ARE MAINTAINED BY
JOHN HASSARD

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INTRODUCTION

THE PRIMARY AIM OF PHILOSOPHY (3) IS TO FIND TRACKS WHICH ORIGINATE ROUGHLY FROM THE INTERACTION POINT, USING ONLY THE INFORMATION CONTAINED IN THE MUON FILTER COORDINATE BANK 'MLR1' BANK NUMBER 1. THIS ENSURES THAT PHIL. 3 CAN BE USED TO LOOK FOR TRACKS IN THE MUON FILTER WITHOUT USING DATA FROM THE REST OF THE JADE DETECTOR.

THE SECONDARY AIM OF PHILOSOPHY (3) IS TO PROVIDE A FAST AND SIMPLE PROGRAM WHICH CAN BE USED IN DATA REDUCTION.

PHILOSOPHY (3) IN A NUTSHELL

PHILOSOPHY 3 (HEREAFTER REFERRED TO AS P3) CAN BE INVOKED WITH A CALL TO A ROUTINE CALLED 'TRACK' AS FOLLOWS:

CALL TRACK(CUT1,CUT2)

'TRACK' CALLS THE FOLLOWING ROUTINES:

- 1) MUANAC
- 2) FIDO
- 3) TRACK0
- 4) TRACK1
- 5) TRACK2
- 6) TRACK3

1) MUANAC IS THE STANDARD MUON FILTER ANALYSIS PROGRAM, WHICH CHECKS THE RAW DATA IN THE BCS BANK 'MLEV' AND CONVERTS THE DRIFT TIMES ETC. INTO CARTESIAN COORDINATES. THE ROUTINE IS ONLY CALLED IF THE COORDINATE BANK 'MLR1' BANK NUMBER '1' DOES NOT YET EXIST FOR THE EVENT. NORMALLY IT WOULD NOT BE CALLED SINCE P1 & P2 ARE RUN AUTOMATICALLY AT LEVEL '8' IN THE SUPERVISOR.

2) FIDO CONVERTS THE CARTESIAN COORDINATES INTO SPHERICAL POLAR COORDINATES (WITH THE AXES CHOSEN CONVENTIONALLY). FURTHERMORE IT ORDERS THE DATA FOR THE HITS, BOTH 'LEFT' AND 'RIGHT' AMBIGUITIES, WITH RESPECT TO PHI.

3) TRACK0 DECIDES WHERE IN PHI TO START SCANNING THROUGH THE HITS. IT ALWAYS CHOOSES TO START AT A POSITION WITH A GAP IN PHI BETWEEN TWO ADJACENT HITS OF GREATER THAN 'CUT1' DEGREES.

4) TRACK1 SCANS THROUGH THE HITS AND TRYS TO FIND LOOSE CLUSTERINGS OF HITS IN PHI. THE LOOSENESS OF THE CLUSTERING IS DETERMINED BY CUT1, WHICH IS TYPICALLY 5 DEGREES.

5) TRACK2 SCANS THROUGH THE 'TRACKS' FOUND BY TRACK1, AND

===== FOR EACH TRACK THE PROCEDURE OF TRACK1 IS REPEATED
WITH A TIGHTER CUT, NAMELY CUT2 WHICH IS TYPICALLY 0.5 DEGREES.

6) TRACK3 CALCULATES THE DIRECTION COSINES OF THE TRACKS WHICH
===== SURVIVE THE RIGOUR OF TRACK2, AS WELL AS OTHER USE-
FULL TRACK PARAMETERS. FINALLY THE DATA FOR EACH TRACK IS STORED IN
THE BOS BANK 'MUR3' BANK NUMBER '1'. (SEE LAST SECTION)

GRAPHICS DISPLAY OF P3 =====

SOME RESULTS OF P3 CAN BE DISPLAYED ON THE GRAPHICS.
(AT THE MOMENT ONLY THE TRACKS ARE DISPLAYED). THE PROGRAM
WHICH DRAWS THE PICTURES, AND WHICH IS STILL UNDER DEVELOPMENT,
IS 'MUR3GH'.

TO SEE THE TRACKS THE USER SHOULD USE THE FOLLOWING
GRAPHICS MODULE:

'F22HAY.MUR3(G)'

WITH THE COMMAND 'SPVA'. I WELCOME YOU TO TRY OUT P3.
(NOTE: THERE IS A GEOMETRICAL PROBLEM WITH THE DISPLAY
PROGRAM IN THE 'ZXC' AND 'ZYC' VIEWS, WHICH IS UNDER INVESTIGATION)

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DETAILS OF PHILOSOPHY 3 RESULTS BANK MUR3 BANK 1

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WORD	TYPE	CONTENT
1	I#4	NUMBER OF TRACKS
2	"	NUMBER OF HITS
3	"	POINTER 'IP1' TO TRACK DATA
4	"	NUMBER OF WORDS/TRACK
5	"	UNUSED
6	"	RUN NUMBER
7	"	EVENT NUMBER
8	R#4	NAME OF PROGRAM (TRAC)
9	"	AUTHOR'S INITIALS (HEP)
10	"	NAME OF EXPERIMENT (JADE)
IP1 + 1	R#4	X
IP1 + 2	"	Y CENTROID OF POINTS
IP1 + 3	"	Z
IP1 + 4	"	DX
IP1 + 5	"	DY DIRECTION COSINES OF TRACK
IP1 + 6	"	DZ
IP1 + 7	"	X1
IP1 + 8	"	Y1 POSITION OF FIRST MEASURED POINT
IP1 + 9	"	Z1
IP1 + 10	"	X1
IP1 + 11	"	Y1 POSITION OF LAST MEASURED POINT
IP1 + 12	"	Z1
IP1 + 13	"	RMIN1 (DEFINED BY THE PROJECTED)
IP1 + 14	"	RMIN2 (MULTI TRACK)
IP1 + 15	"	THETA &
IP1 + 16	"	PHI OF TRACK
IP1 + 17	I#4	NUMBER OF HITS IN TRACK

IP1 + 18	R#4	PHI OF FIRST MEASURED POINT
IP1 + 19	"	PHI OF LAST MEASURED POINT
IP1 + 20	I#4	ERROR CODE (= 1 = OK)

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