UR1981_37

1981/37. FORTRAN program for the drift correction of gravity data.

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Abstract

This program removes a linear drift from gravity readings made at times between the occupation of two base stations. The base stations need not be the same.

THE PROGRAM

GRVDFT (Appendix 1)

This program reads station times and meter readings on logical unit 3 and prints drift and datum corrected differences on logical unit 4. All times are in 24 hour notation with a decimal point separating the hours and minutes (*e.g.* 10.25).

The following input data is read (in F10.1) format:

TIME 1 the time of reading base 1
BASE 1 the meter reading at base 1
SHIFT 1 any shift to be applied to base 1 to correct it to the datum
   (in the same units as BASE 1)
TIME 2 the time of reading base 2
BASE 2 the meter reading at base 2 (in the same units as BASE 1)
SHIFT 2 any shift to be applied to base 2 to correct it to the same
   datum as base 1 (in the same units as BASE 1)

For each station:

STIME the time of reading the station - if STIME = 0 the program stops.
STNVAL the station reading (in the same units as BASE 1)

Output is a drift corrected difference relative to the datum (in the same units as BASE 1).

[16 July 1981]

APPENDIX 1

Program GRVDFT

GRAVITY DRIFT CORRECTION

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C TITLE GRVDFT
C A PROGRAM TO REMOVE A LINEAR DRIFT FROM GRAVITY READINGS
C RELATIVE TO TWO BASE STATIONS WHICH MAY OR MAY NOT BE THE SAME
C AND MAY OR MAY NOT BE THE SURVEY DATUM.
C TIMES MUST BE IN 24 HOUR NOTATION
        REAL TIME1, TIME2, BASE1, BASE2, SHIFT1, SHIFT2, DRIFT, STIME,
      . STNVAL, VALUE
   55 WRITE(4,100)
  100 FORMAT(' BASE 1 TIME?')
        READ(3,101) TIME1
  101 FORMAT(F10.1)
C READ TIME AS E.G. 10.56 FOR TEN FIFTY-SIX
C MUST BE IN 24 HOUR FORMAT
        IF (TIME1 .GT. 24.0) GOTO 55
C NO DECIMAL POINT IN TIME1
        CALL HOURS(TIME1)
C CORRECTION TO HOURS
        WRITE(4,102)
  102 FORMAT(' BASE 1 READING?')
        READ(3,101) BASE1
        WRITE(4,103)
  103 FORMAT(' BASE 1 SHIFT?')
        READ(3,101) SHIFT1
        WRITE(4,104)
  104 FORMAT(' BASE 2 TIME?')
   56 READ(3,101) TIME2
C MUST BE IN 24 HOUR FORMAT
        IF (TIME2 .GT. 24.0) GOTO 56
C TIME HAS NO DEC. PT.
        CALL HOURS(TIME2)
        WRITE(4,105)
  105 FORMAT(' BASE 2 READING?')
        READ(3,101) BASE2
        WRITE(4,106)
  106 FORMAT(' BASE 2 SHIFT?')
        READ(3,101) SHIFT2
C HAVE READ THE BASE STATION PARAMETERS
C
C NOW CALCULATE THE DRIFT PER HOUR
        DRIFT=((BASE2-SHIFT2)-(BASE1-SHIFT1))/(TIME2-TIME1)
C
   10 WRITE(4,107)
  107 FORMAT(' STN TIME?')
        READ(3,101) STIME
        IF (STIME .EQ. 0.) STOP
C TERMINATOR OF RUN
        IF (STIME .GT. 24.0) GOTO 10
C TIME HAS NO DEC. PT.
        CALL HOURS(STIME)
        WRITE(4,108)
  108 FORMAT(' STN VALUE?')
        READ(4,101) STNVAL
```

```
C
C NOW CALCULATE DRIFT CORRECTED VALUE
      VALUE=STNVAL-(DRIFT*(STIME-TIME1))-(BASE1-SHIFT1)
      WRITE(4,109) VALUE
  109 FORMAT(' VALUE',F9.1)
      GOTO 10
      END
 .U      0000R   EXT FUNC
 TIME1   037CR   REAL VAR
 TIME2   0380R   REAL VAR
 BASE1   0384R   REAL VAR
 BASE2   0388R   REAL VAR
 SHIFT1  038CR   REAL VAR
 SHIFT2  0390R   REAL VAR
 DRIFT   0394R   REAL VAR
 STIME   0398R   REAL VAR
 STNVAL  039CR   REAL VAR
 VALUE   03A0R   REAL VAR
 55      0004R   LABEL
 100     001CR   LABEL
 @H      0000R   EXT FUNC
 101     0052R   LABEL
 HOURS   0000R   EXT FUNC
 102     0090R   LABEL
 103     00E0R   LABEL
 104     012ER   LABEL
 56      0144R   LABEL
 105     0196R   LABEL
 106     01E6R   LABEL
 10      0250R   LABEL
 107     0268R   LABEL
 .S      0000R   EXT FUNC
 108     02E0R   LABEL
 109     0360R   LABEL
 .V      0000R   EXT FUNC

0000 ERRORS
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```
      SUBROUTINE HOURS(TIME)
      REAL HR,MINS,TIME
      HR=IFIX(TIME+0.005)
C ENSURE TIME ROUNDS DOWN TO THE CORRECT HOUR
      MINS=TIME-HR
C MINUTES
      MINS=MINS*1.666667
C CONVERT MINUTES TO DECIMAL HOURS
      TIME=HR+MINS
      RETURN
      END
  HOURS   0024R   FUNC/SUB
  HOURS   008CR   FUNC VAR
  .Q      0000R   EXT FUNC
  .P      0000R   EXT FUNC
  TIME    002AR   FORM PAR
  HR      0094R   REAL VAR
  MINS    0098R   REAL VAR
  IFIX    0000R   EXT FUNC
  .W      0000R   EXT FUNC

0000 ERRORS
```