4) Algorithm B also has a very poor sensitivity when the points are close to the poles ($\sqrt{x_e^2+y_e^2}\approx 0$). In order to deal with this case (when $\sqrt{x_e^2+y_e^2}\leq 10$ km), a direct computation can be used, e.g.,

$$h=|z_e|-b,\quad \phi=\pm 90\text{ deg},\quad \lambda=\arctan(y_e/x_e)$$

In conclusion, algorithm A is definitely preferred over algorithm B when the points are close to the poles.

Appendix

One of the most efficient iterative algorithms known in the literature (based on direct use of a Newton-Raphson technique) can be implemented as follows:

Algorithm B

Given: x_e, y_e, z_e and a, e^2; ϵ = imposed accuracy; and $k_{\max}$ = maximum number of iterations permitted.

1) Initialize:

$$h=0,\qquad R=a,\qquad k=0$$

2) Set $k\leftarrow k+1$, $h_{\text{old}}\leftarrow h$.

3) Compute

$$\tan\phi=\frac{z_e}{\sqrt{x_e^2+y_e^2}}\;\frac{R+h}{(1-e^2)R+h}$$

4) Compute

$$\sin^2\phi=\frac{\tan^2\phi}{1+\tan^2\phi}$$

5) Compute

$$R=\frac{a}{\sqrt{1-e^2\sin^2\phi}}$$

6) Compute altitude

$$h=\sqrt{x_e^2+y_e^2}\;\sqrt{1+\tan^2\phi}-R$$

7) If $|h-h_{\text{old}}|\leq\epsilon$ go to step 9, else go to step 8.

8) If $k<k_{\max}$ go to step 2, else stop and write a message "the algorithm does not converge" or set a flag.

9) Compute geodetic latitude

$$\phi=\arctan(\tan\phi)$$

10) Compute geodetic longitude

$$\lambda=\arctan(y_e/x_e)$$

Reference

[1]Barbee, T., "Geodetic Latitude of Target Point," Space Applications Corp., unpublished notes, 1979.

ERRATA

- "Fuel-Optimized Maneuvers of a Spacecraft Relative to a Point in Circular Orbit," Vol. 7, No. 6, 1984, pp. 710-716. In the third paragraph of the Introduction, the word "opposite" should be inserted in the ninth line so that the sentence reads, "...the positive x_1 axis is in the opposite direction of the orbital velocity of the satellite..."

- "Strapdown Inertial Navigation System Requirements Imposed by Synthetic Aperture Radar," Vol. 8, No. 4, 1985, pp. 433-439. The first seven lines of p. 434, col. 2, from Eq. (5) through "ability of the IMU," duplicate material on the following page and should be deleted. On p. 436, in the paragraph following Eq. (16), the phrase, "below the quantization level," should read, "below (quantization level)/t_c."

Book Announcements

GERBER, E.A. and **BALLATO, A.**, editors, U.S. Army Electronics Technology Devices Laboratory, ***Precision Frequency Control, Vol. 1: Acoustic Resonators and Filters.*** Academic Press Inc., New York, 1985, 434 pages. $69.50.

Purpose: The purposes of this text are to present a concise compendium of the state of the art of precision frequency control to researchers and specialists working in the field and to furnish information concerning properties and capabilities of frequency-control devices. Of particular interest might be the 130 pages of references contained in the text.

Contents: Properties of piezoelectric materials (L. Halliburton, J. Martin, D. Koehler). Theory and properties of piezoelectric resonators and waves (T. Mieker, W. Shreve, P. Cross). Radiation effects on resonators (J. King, D. Koehler). Resonator and device technology (J. Kusters). Piezoelectric and electromechanical filters (R. Smythe, R. Wagers). Long-term stabiltiy and aging of resonators (E.A. Gerber). Bibliography. Index.

GERBER, E.A. and **BALLATO, A.**, editors, U.S. Army Electronics Technology Devices Laboratory, ***Precision Frequency Control, Vol. 2: Oscillators and Standards.*** Academic Press Inc., New York, 1985, 460 pages. $69.50.

Purpose: Same as Volume 1. Of particular interest might be the 150 pages of references contained in the text.

Contents: Resonator and device measurements (E. Hafner). Precision oscillators (W. Smith and T. Parker). Temperature control and compensation (M. Frerking). Microwave frequency and time standards (H. Hellwig). Laser frequency standards (R. Buser and W. Koechner). Frequency and time—their measurement and characterization (S. Stein). Frequency and time coordination, comparison, and dissemination (D. Allan). Other means for precision frequency control (F. Walls). Special applications (F. Walls and J. Gagnepan). Specifications and standards (E. Hafner). Bibliography (E.A. Gerber and A. Ballato).