It is calculated that if the average pulse visual magnitude is better than 18 then the pulse will be 3 standard deviations above the noise after approximately one hour's averaging.

The program is also being used by one of us (P.S.W.) in a search for decametric radio pulsations from low dispersion pulsars.

The authors wish to thank Dr P. A. Hamilton for help throughout this work.


On the Regularity of Motions of the Pole

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This paper suggests reasons why certain forms and frequencies are found in librations of the pole. The period is about 27 years, but there is also a shorter period which was found empirically to vary with the inverse of the amplitude of the Chandler nutation. It had been found also that the pattern of the motions would sometimes become reversed. 1

The model for discussing this behaviour assumes that the Earth's weaker material would flow under stress but that the stronger material would constrain it to behave as a time-dependent elastic substance (i.e. anelastically). Higher stresses would be borne by only strong material, so then the rigidity would appear high. Creep could occur at all stresses.

Let the rotation pole P be initially at rest at the origin 0 of the coordinate system, and let steady and annual excitations begin at zero time. These cause P to describe the Chandler nutation. Each nutation is accompanied by an anelastic deformation excitation (k/k_f)m, where m is the position of P relative to O', the current point of rest.

Insofar as the Earth does not suffer permanent deformation, it can be treated as a Kelvin-Voigt body, 2 for which

\[ k = k_f \left(1 - \frac{\mu_0}{1 + \mu} \right) \]

k and k_f are Love numbers, \( \mu \) and \( \bar{\mu} \) are respectively the dimensionless and dimensional tidal-effective rigidities, and \( \bar{\eta} \) is the tidal-effective viscosity.

For durations of the order of a Chandler period the effect of the imaginary part which is not due to an Earth with-out oceans would be 0.055 or 0.069. Then the period of \( \nu_2 \) would be 30 or 24 years, which is about the main libration period.

In brief, the system includes a steady excitation plus a deformation excitation that revolves eastwards with secular frequency \( \nu_2 \). Relative to this the annual mean excitation pole is revolving eastwards with frequency \( \nu_1 \); and the system as a whole is migrating with respect to the Conventional International Origin.

However the observed system is unsymmetrical, as though the mean rotation pole were tethered. Librations appear fairly free to swing across the progressive motion, or to recoil, but advances are limited. This suggests that the rigidity increases with the stress so that the displacements would depend upon the logarithm of the total excitation.

Investigations are being made into this possibility; and also into how far the excitation with frequency \( \nu_2 \) is responsible for the observed reversals.


National Mapping's Astro-Geodetic Complex

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Introduction

The Division of National Mapping has received, on long term loan from NASA and in co-operation with the Smithsonian Astrophysical Observatory, a Lunar Laser Ranging instrument consisting of a gigawatt pulsed ruby laser, a 150 cm aspheric Ritchey-Chretien telescope, and associated electronic equipment. The instrument was formerly operated by the Air Force Cambridge Research Laboratories at Mount Lemmon in Arizona. Its principal use by National Mapping will be direct determination of the distance between the telescope and any of the three retro-reflector arrays placed on the Moon at Hadley’s Rille, Fra