Reply by Author to W. O. Schiehlen

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SCHIEHLEN'S comments regarding the pitch stability charts are correct. After several attempts to locate the problem, the author discovered that written in the Floquet analysis computer program was $(1+e^2)$ for the quantity $(1+e)^2$, which appears twice in the periodic coefficient [see Eq. (12) of Ref. 1]. The correct stability chart for $g = 0$ (replacing Fig. 2 of Ref. 1) is shown in Fig. 1 of this reply. The grid for the investigation was a 0.05 increment in each parameter with e ranging from 0 to 0.95. Only the points for which instabilities occurred are noted. The chart is in agreement with Fig. 1 of Schiehlen's Comment. Figure 2, which replaces Fig. 3 of Ref. 1, is a similar stability chart for $g = 0.3$. For the gain $g = 1.0$ (Fig. 4 of Ref. 1), the correct chart shows stability at all points of the grid except for $e = 0$ and $k < 0$; $e = 0.05$ and $k = -0.15$ to -0.35; $e = 0.10$ and $k = -0.30$; $e = 0.15$ and $k = -0.35$.

The author was unaware of and appreciated reference to the fact that the time constant for the damped Hill equation depends only upon the damping coefficient (for $|\lambda_j| = 1$). Schiehlen's suggestion that numerical error accounts for the apparent asymptotic stability in the case $g = 0$ is undoubtedly correct. Reinvestigation of the time constant calculations has indicated severe sensitivity of the results at large eccentricities with the step size of the integration algorithm.

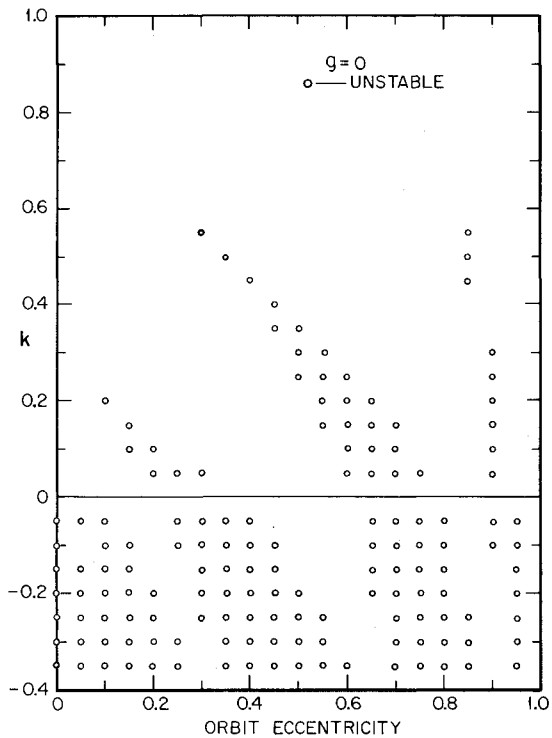

Fig. 1 Pitch stability chart, $g = 0$.

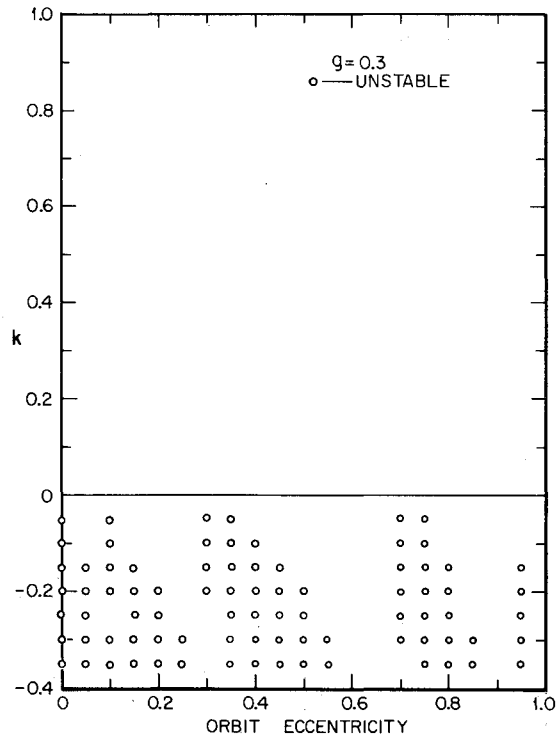

Fig. 2 Pitch stability chart, $g = 0.3$.

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Reference

[1] Connell, G. M., "A Method of Earth-Pointing Attitude Control for Elliptic Orbits," *AIAA Journal*, Vol. 10, No. 3, March 1972, pp. 258–263.