Undamped libration frequency content 1.4 Phobian mean motion Longitudinal normal mode 1.2 1.0 8.0 $A[^{Q}]$ 0.6 0.4 0.2 0.0 5.0 7.5 12.5 15.0 17.5 0.0 2.5 10.0 20.0 ω [rad/day]