1086-37-140   **Ryan Mulcahy*** (`mulcahyr@augsburg.edu`), Department of Mathematics, Augsburg College, Minneapolis, MN 55454, and **Christiana Sabett** (`cmsabett@smcm.edu`), Mathematics and Computer Science, St. Mary's College of Maryland, St. Mary's City, MD 20686. *Lang-Kobayashi.*

A system of two identical, delay coupled semiconductor lasers described by the Lang-Kobayashi equations is considered. We investigate the geometric background of the existence of compound laser mode (CLM) solutions, periodic solutions corresponding to a constant electric field amplitude and constant inversion number. Included is an investigation of the bifurcation scenarios depending upon the coupling rate. The structure of stable CLM solutions is characterized on the coupling rate - detuning parameter domain. Time integration reveals an eventual loss of stability characterized by the appearance of pulsating solutions that develop into Low Frequency Fluctuations (LFFs). We identify individual regions for each type of solution on a limited portion of the coupling rate - detuning parameter plane. The structure of the regions on a larger subset of the plane is hypothesized based on regression analysis. (Received July 27, 2012)