HOMEWORK 5
Due Oct 11

1. Exercises 9,10 page 56
2. Exercise 11 page 64
3. Suppose that $A(t+T) = A(t)$ and that $A(-t) = -A(t)$. Let $\Phi(t)$ be the principle fundamental matrix for $x' = A(t)x$. Show that $\Phi(-t) = \Phi(t)$. Use this to show that all solutions to $x' = A(t)x$ are periodic.
4. Let $A(t) = A(t+T)$ be a 2×2 periodic matrix. The characteristic equation for the monodromy matrix can be written as

$$r^2 - ar + b.$$

The diagram below shows a triangle in the $(a,b)-$plane. Show that (a) All Floquet multipliers lie inside the unit circle if and only if (a,b) are in the triangle; (b) there exist $T-$periodic solutions along edge B; (c) there exist $2T-$periodic solutions along edge A; (d) what kinds of solutions exist along edge C? (Hint: the product of the multipliers is b and the sum is $-a$.)