

## Reading Assignment 14

### Read Sect. 5.4

1. What type of subspaces of a vector space  $V$  are studied in Section 5.4?
2. Define a  $T$ -invariant subspace of a vector space  $V$ .
3. Give examples of  $T$ -invariant subspaces that you have encountered so far in the study of linear algebra.
4. Define a  $T$ -cyclic subspace of a vector space  $V$ .
5. Give an example of a  $T$ -cyclic subspace.
6. What does the symbol  $T_W$  mean? See paragraph before Theorem 5.21.
7. What is the relationship between the characteristic polynomial of a linear operator  $T : V \rightarrow V$  and the characteristic polynomial of  $T_W$ , where  $W$  is a  $T$ -invariant subspace?
8. Give an example that illustrates Theorem 5.21.
9. How do we find a basis of a finite dimensional  $T$ -cyclic subspace containing a nonzero vector  $v$ ?
10. What does Theorem 5.22 say about the characteristic polynomial of  $T_W$ , where  $W$  is a finite dimensional cyclic subspace of a vector space  $V$ ?
11. State the Cayley-Hamilton Theorem.
12. Give an example to illustrate the Cayley-Hamilton theorem.

**Practice Problems:** # 1, 2, 3, 6,