

**2.30.** The problem of a binding accelerator cable led to a proposed direct linkage between the accelerator pedal and the carburetor using a six-bar linkage—two four-bars in series. Figure P2.21 shows the required link rotations as well as the location of the three ground pivots. Synthesize the six-bar function generator by:

- (a) The graphical method of Fig. 2.49.
- (b) The overlay method.
- (c) The loop-closure method.
- (d) Freudenstein's equation.

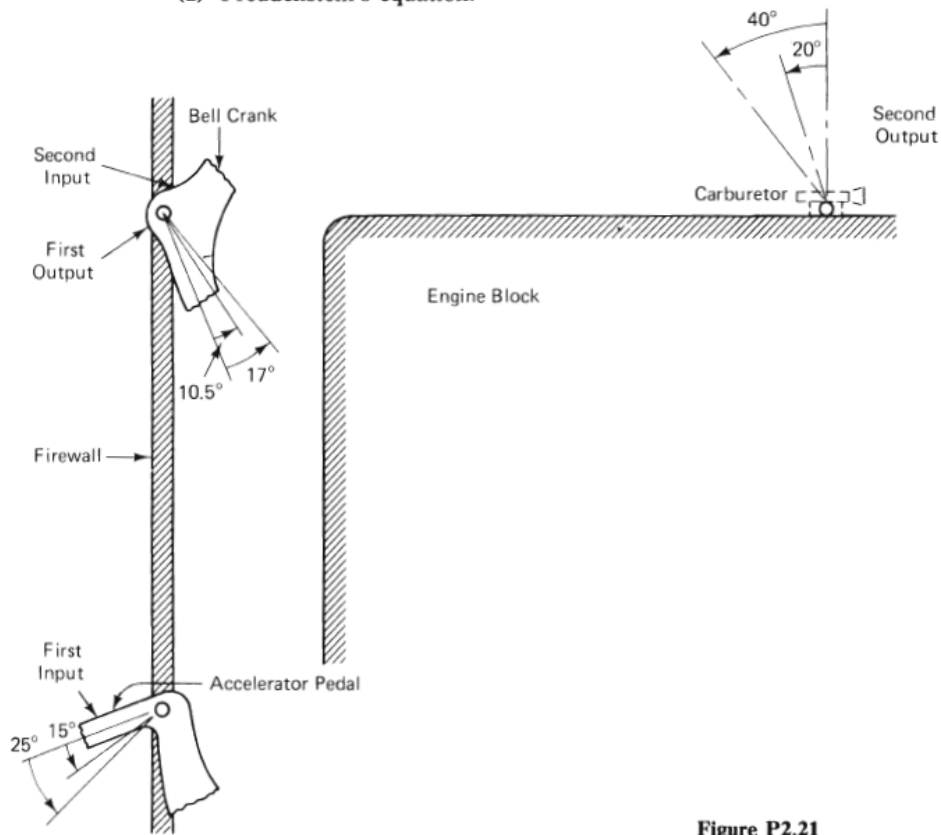


Figure P2.21

- 2.32. A geared six-bar function generator (Fig. P2.23) is synthesized for the maximum number of positions allowable by linear solution techniques. Vector  $\mathbf{Z}_6$  as well as  $T_2/T_1$ ,  $T_4/T_5$ , and  $\phi_j = f(\psi_j)$  are known quantities.
- Write the loop-closure equation for this linkage in its first and  $j$ th positions.
  - Determine the maximum number of positions that this linkage can be synthesized for.
  - What is the maximum number of positions for which a linear solution is obtainable?

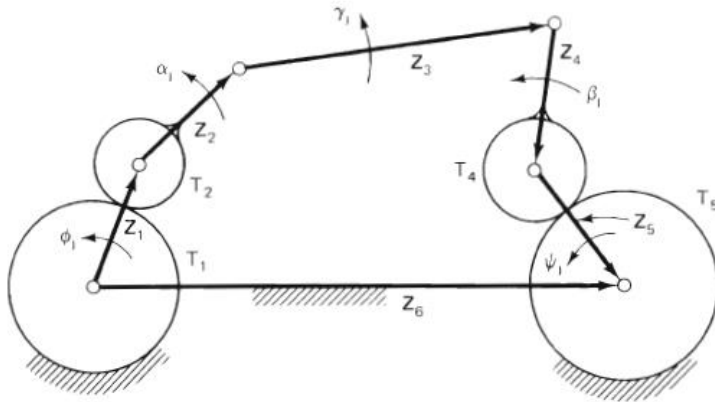


Figure P2.23

- 2.34. The geared linkage shown in Fig. P2.25 is to be used as a function generator where  $\phi_j$  is the independent (input) variable (a rotation of arm  $\mathbf{Z}_1$ ) and  $S_j$  is the dependent (output) variable (a linear displacement of the slider).  $\phi_j$  and  $S_j$  are prescribed as well as  $T_2/T_1$  and  $\mathbf{Z}_5$ .
- Write the loop-closure equation for this linkage in its first and  $j$ th positions.
  - Determine the maximum number of positions that this linkage can be synthesized for.
  - What is the maximum number of positions for which a linear solution is obtainable?

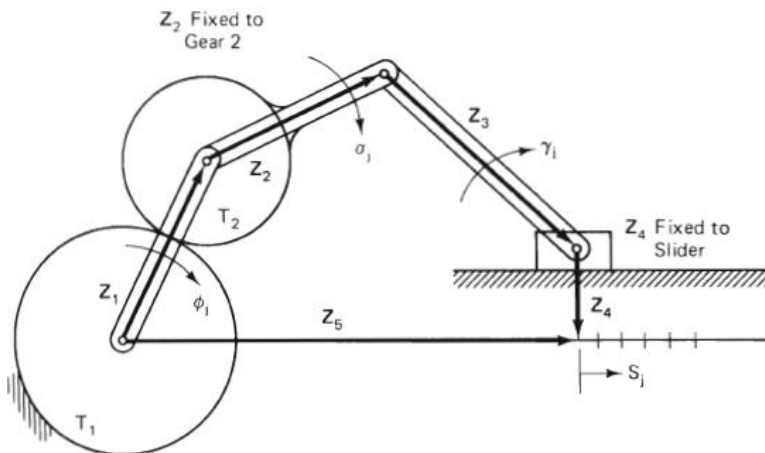


Figure P2.25

2.36. The six-bar linkage of Fig. P2.27 is to be synthesized for both path generation of point  $P$  and function generation  $[\theta_j = f(\phi_j)]$ . Write the standard-form equations for this so that the entire linkage may be synthesized by the standard form.

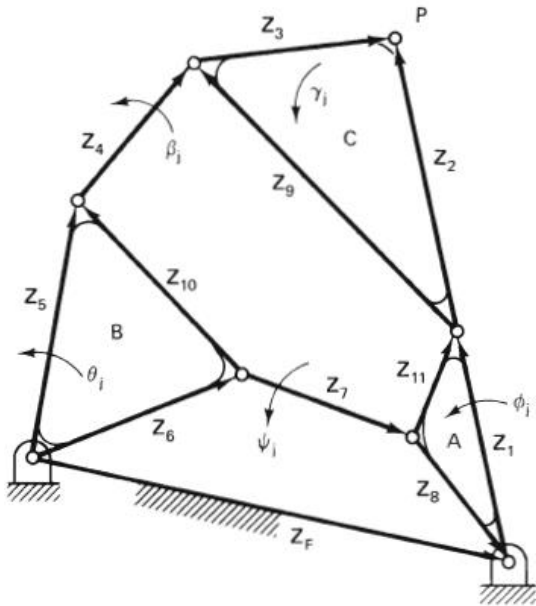


Figure P2.27

2.39. Write the displacement, velocity, and acceleration equations describing the linkage in Fig. P2.30.

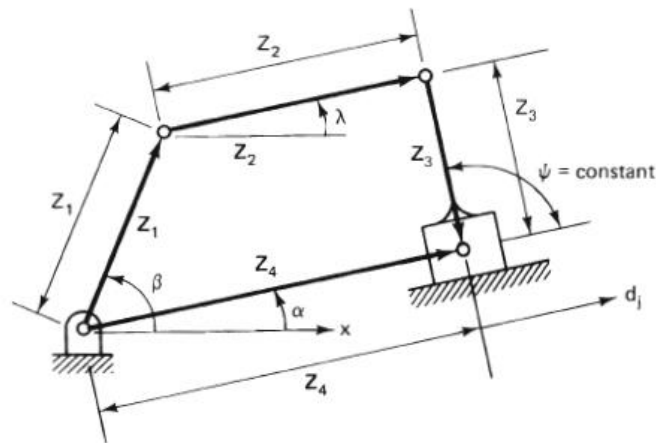


Figure P2.30