Gear ratio $\quad \lambda = \pm \dfrac{r_2}{r_5}$

Phase angle $\quad \phi = \theta_5 - \lambda\theta_2$

FIGURE P4-4

Problems 4-16 to 4-17. Open configuration and terminology for the geared fivebar linkage

*4-16   The link lengths, gear ratio (λ), phase angle (ϕ), and the value of θ_2 for some geared fivebar linkages are defined in Table P4-4. The linkage configuration and terminology are shown in Figure P4-4. For the rows assigned, draw the linkage to scale and graphically find all possible solutions for angles θ_3 and θ_4.

*†4-17   Repeat Problem 4-16 except solve by the vector loop method.

TABLE P4-4   Data for Problems 4-16 to 4-17

Row	Link 1	Link 2	Link 3	Link 4	Link 5	λ	ϕ	θ_2
a	6	1	7	9	4	2	30	60
b	6	5	7	8	4	−2.5	60	30
c	3	5	7	8	4	−0.5	0	45
d	4	5	7	8	4	−1	120	75
e	5	9	11	8	8	3.2	−50	−39
f	10	2	7	5	3	1.5	30	120
g	15	7	9	11	4	2.5	−90	75
h	12	8	7	9	4	−2.5	60	55
i	9	7	8	9	4	−4	120	100

* Answers in Appendix F.

† These problems are suited to solution using *Mathcad, Matlab,* or *TKSolver* equation solver programs. In most cases, your solution can be checked with program FOURBAR, SLIDER, or SIXBAR.