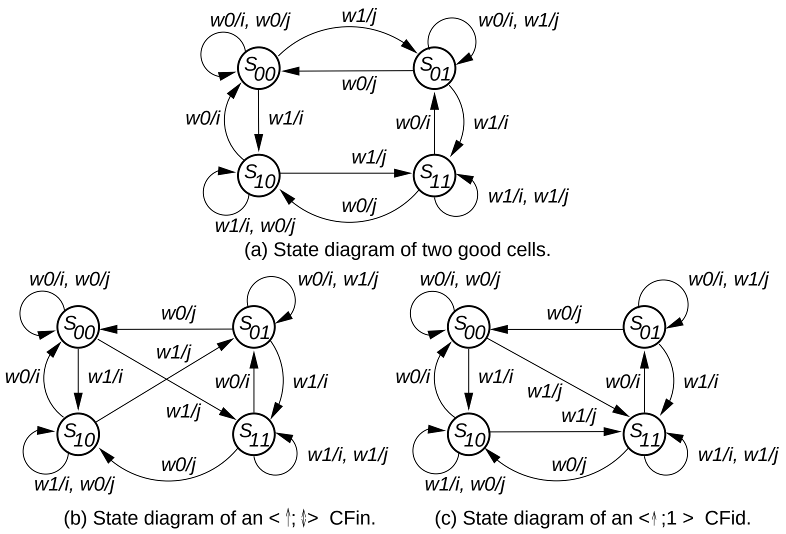

Figure 9.8: State diagrams for CFin and CFid.

1. Using the sequence $i \rightarrow j \rightarrow k$ and/or its reverse. In this case: (i) The two CFins will mask each other for any march element marching 'up', and (ii) Neither will be triggered for an element marching 'down'. Therefore, the march test fails to detect the linked CFins.

2. Using the sequence $k \rightarrow i \rightarrow j$ and/or its reverse, in which case any 'up' or 'down' march would mask the two CFins. ■

Idempotent Coupling Faults. An *idempotent coupling fault* (CFid) is where an $\uparrow$ or $\downarrow$ transition in cell C_j sets cell C_i to 0 or 1. This is denoted as $<\uparrow; 0>$ or $<\uparrow; 1>$, depending on whether cell i is set to 0 or 1, for a rising transition for cell j. The other two idempotent coupling faults are $<\downarrow; 0>$ and $<\downarrow; 1>$. A test to *detect* all CFids has this necessary condition:

> *For all coupled (victim) cells, each should be read after a series of possible CFids may have happened by writing into the coupling (aggressor) cells, such that the sensitized CFids do not mask each other; the coupled (victim) cells are read while their state is opposite from the good machine state.*

A CF is *asymmetric* [506] when it causes the coupled (victim) cell to undergo only a $\uparrow$ or a $\downarrow$ transition. The CF is *symmetric* when the coupled (victim) cell experiences both transitions due to the fault. The inversion coupling fault CFin $<\uparrow; \updownarrow>$ is a symmetric fault. The CF is *one-way* if it is sensitized only by a rising or falling transition of the coupling (aggressor) cell, and *two-way* if either transition sensitizes it. Figure 9.8(c) shows the state transition diagram for the CFid fault $<\uparrow; 1>$.

Dynamic Coupling Faults. A *dynamic coupling fault* (CFdyn) occurs between cells in different words. A read or write operation on one cell forces the contents of