connective network at its own level, or that there need be a single cul-de-sac.

Picking up on the tree analogy again (Figure 7.3): a fifth structural condition is the *frequency distribution* of the different elements, in inverse proportion to their rank order – there is one trunk, a few main limbs, many branches and a multitude of twigs. Although this distribution may be associated with 'branching structure', it could still refer to non-physical organisation, such as a 'pyramidal' distribution of employees in a company – or a tree possessing tens of fruits and hundreds of leaves. At this stage, the analogy implies that there would be a few main roads, several intermediate roads and many minor roads. As yet, there is still no definite implication of configuration.

The sixth and final condition is that of the *structural configuration* of the elements. This is the sense that the tree forms a 'tree-like' system of branching, where each path eventually ends as a twig. Now, finally, we have the implication for layout: the discontinuity of the minor routes in the network, epitomised by the full stop of the cul-de-sac. Here, finally, the road network becomes, mathematically, a 'tree'.

We can rest here in the tree analogy, metaphorically, and look back at the view. We have covered the first four structural conditions, which seem to equate more or less with issues of hierarchy. The last two bring us closer to the conception of a mathematical tree, relating to configuration. A network could be represented with a set of elements which had definite number (condition 5) and configuration (condition 6), but no explicit hierarchical ordering. Indeed, this is the case for a typical graph-theoretical arrangement of elements, as in conventional transport network analysis. For example, Figure 7.4 shows a network which has a definite number of links in a definite configuration; but there is no indication of arteriality or access constraint or ordering, since each link is hierarchically undifferentiated.

From this point, we can see where the rest of the tree analogy would take us – without necessarily going there in detail. Having arrived at the configuration of a tree, we can see further connotations of the tree analogy that relate to composition. These would relate to the orientation of elements, the size of elements and the shape of elements. Beyond the sixth condition – which is configurational – road networks start diverging from trees in shape, size and so on, and any analogy becomes less useful.

Conclusions on the nature of structure

We have already seen several different ways of interpreting a tree's structure – there are at least six tree-like connotations of structure: conditions
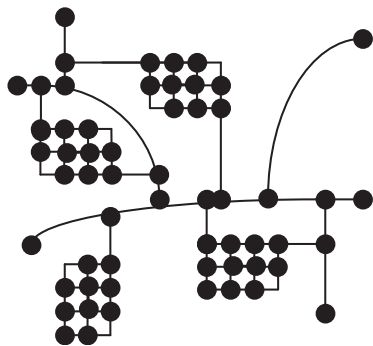
7.4 • A network of links without hierarchical differentiation.