evasive path is in NP since we may check, for an s-t path P, whether $|P \cap Z_i| \leq 1$ for each i.

Now let us suppose that we have an instance of *3-sat* with n variables $x_1, \ldots, x_n$ and t clauses. We create the following directed graph $G = (V, E)$. The vertices will be partitioned into *layers*, with each node in one layer having edges to each node in the next. Layer 0 will consist only of the node s. Layer i will have two nodes for $i = 1, \ldots, n$, three nodes for $i = n+1, \ldots, n+t$, and only the node t in layer $n+t+1$. Each node in layers $1, 2, \ldots, n+t$ will also be assigned a *label*, equal to one of the $2n$ possible literals. In layer i, for $1 \leq i \leq n$, we label one node with the literal x_i and one with the literal $\overline{x_i}$. In layer $n+i$, for $1 \leq i \leq t$, we label the three nodes with $\ell_{i_1}, \ell_{i_2}, \ell_{i_3}$, where $\{\ell_{i_j}\}$ are the three literals appearing in clause i. Finally, for every pair of nodes whose labels correspond to a variable and its negation, we define a distinct zone Z.

Now, if there is a satisfying assignment for the *3-sat* instance, we can define an s-t path P that passes only through nodes with the labels of literals set to *true*; P is thus an evasive path. Conversely, consider any evasive path P; we define variable x_i to be *true* if P passes through the vertex in layer i with label x_i, and *false* if P passes through the vertex in layer i with label $\overline{x_i}$. Since P does not visit any zone a second time, it must therefore visit only nodes whose labels correspond to literals set to *true*, and hence the *3-sat* instance is satisfiable.

[1] ex636.680.130