**Exact solutions for 1D lattice models with topological compli-
cated configuration**[1] LEI FANG, DAVID SCHMELTZER, The City College of
The City University of New York — In this work a transfer matrix method is de-
veloped to study 1D lattice models within the tight binding framework. Employing
this method we show, from simple to difficult, the solutions of a semi-infinite wire,
a finite open wire, a single closed ring and two coupled rings. We start by studying
local properties of solutions in a homogeneous region. It is found that a calculation
of the exponential of the transfer matrix is necessary for us to obtain the general
form of wave functions in the entire homogenous region. Then by matching wave
functions at boundaries or connecting junctions we can get equations that deter-
mine the spectrum. In this way we have solved the problem of two coupled rings (a
topologically complicated configuration) and it is shown there can exist bound state
in this system.

Lei Fang
The City College of The City University of New York

Date submitted: 04 Nov 2015   Electronic form version 1.4