

610 Fall 2014 – Homework 7 Due Th 10/23/14

1. (60 points, lossless $y(s)$ synthesis)
 - a) Synthesize $y(s) = [5s^3 + 21s]/[s^4 + 8s^2 + 15]$ by the two Foster and the two Cauer forms.
 - b) Synthesize $z(s) = [5s^3 + 21s]/[s^4 + 8s^2 + 15]$ by the two Foster and the two Cauer forms and compare with the results of a).
 - c) Synthesize $y(s) = 5s/[s^2 + 7]$ by using the Richards' section extractions at $k=1$.
 - d) Repeat c) by extracting sections at $k=-1$ and compare with the results of c0).

2. (40 points, transfer function synthesis)
 - a) Synthesize the transfer function of a lossless ladder 2-port loaded in a 1 Ohm resistor
$$Y_{21}(s) = k/(s^3 + 2s^2 + 2s + 1)$$
 - b) Evaluate the resulting constant k .