

## 8.5 Filter Implementations

Reading Assignment: pp. 405-411

**Q:** *So, we now know how to make any and all filters with lumped elements—but this is a microwave engineering course!*

**You** said that lumped elements were difficult to make and implement at microwave frequencies. **You** said that distributed elements were used to make microwave components. So how do we make a filter with **distributed elements!**?!?

**A:** There are many, many ways to make microwave filters with distributed elements. Perhaps the most straightforward is to “**realize**” each individual lumped element with transmission line sections, and then insert these **approximations** in our lumped element solutions.

The first of these realizations is:

### HO: RICHARD'S TRANSFORMATIONS

To easily **implement** Richard's Transforms in a microstrip or stripline circuit, we must apply one of **Kuroda's Identities**.

### HO: KURODA'S IDENTITIES