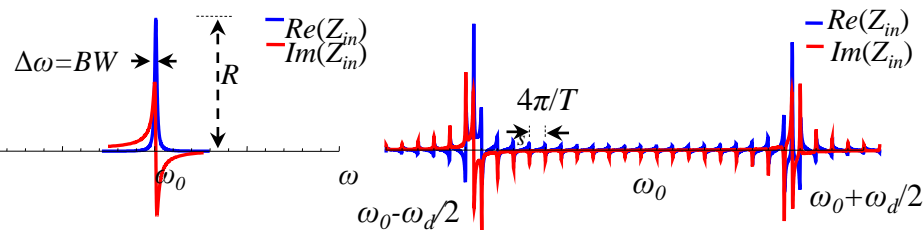


Impedance Modulation

- Dynamic multi-band antennas for SDR application
- Antenna Miniaturization beyond the fundamental limits
- Negative resistance wideband antenna design
- Dynamic band reconfigurable filter design



Technical Approach:

- **Task 1:** Formulate impedance modulated resonators including cavities and antennas for an arbitrary modulation.
- **Task 2** Develop theoretical bases and analytical tools to introduce effects of impedance modulation in the near-field and far-field of distributed components.
- **Task 3:** Define practical criteria to design impedance modulated resonators and antennas.
- **Task 4:** Study signal integrity, including noise and dispersion, for impedance modulated components.
- **Task 5:** Use impedance modulation to design dynamic band reconfigurable filters.

Present and past actions

- A prototype of a dynamically controlled multi-band antenna has been tested successfully.

Operational and Performance Capabilities - Summary

Impedance modulation creates a new arena in antenna and circuit design. Antenna miniaturization's fundamental limits can be broken. Frontend of transceivers can be simplified and their performances can be improved by impedance modulated antennas and filters.

- Maximize bandwidth of small antennas
- Improve efficiency of structure
- Minimize power requirements
- Evaluate performance in new frequency bands and determine the tradeoffs

ROM and Schedule:

- Task 1: ROM=\$50,000, POP=6 mos
 - Task 2: ROM=\$50,000, POP=6 mos
 - Task 3: ROM=\$75,000, POP=9 mos
 - Task 4: ROM=\$50,000, POP=6 mos
 - Task 5: ROM=\$75,000, POP=9 mos
- Total Cost: \$300,000

Deliverables:

- Theoretical basis for impedance modulation
- Practical procedure for antenna and filter design
- prototyping and demonstration of sample designs

Corporate Information:

Virginia Tech, Wireless@VT, VA Tech Antenna Group

Dr. Majid Manteghi

302 Whittemore Hall (0111), Blacksburg, VA, 24061

Tel: 540-231-6834; Fax: 540-231-3362; E-mail: manteghi@vt.edu

<http://antenna.ece.vt.edu/>