Connection with infinite arrays: Rayleigh–Bloch waves

Rayleigh–Bloch waves

- Rayleigh–Bloch waves propagate along infinite arrays.
  - Decay exponentially away from array, i.e. "array bound".
- Wavenumber $\beta \in \mathbb{R}$: $k < \beta < \pi$.
- RB waves "cut-off" for $k = k_\mathrm{c} < \pi$.
- Incident waves cannot excite RB waves on infinite arrays.

Resonances on finite arrays

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  - RB waves reflect off array ends.
  - Resonances due to constructive interactions between reflected RB waves.
- Resonance occurs for $k \approx k_\mathrm{c}$ and $\beta \approx \pi$.
- Explains primary resonance ($k < \pi$) <u>but not</u> higher-order resonances ($k > \pi$).

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