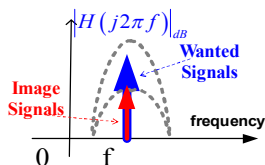
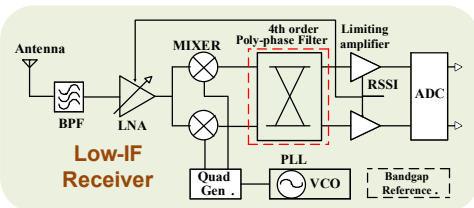


1. Research Objective

Solving problems:

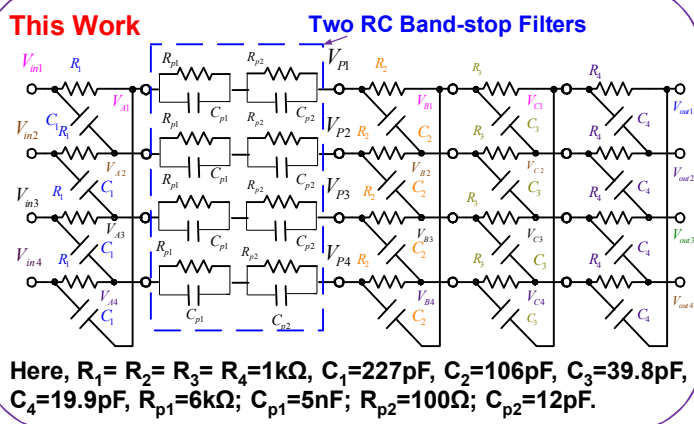
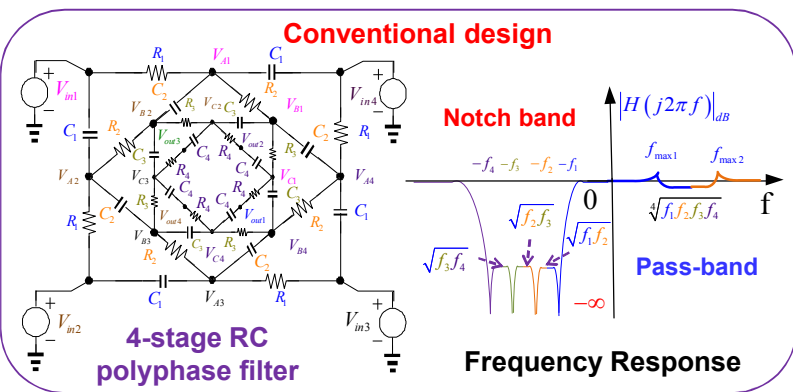
- Un-flat pass-band gain
- Image signals



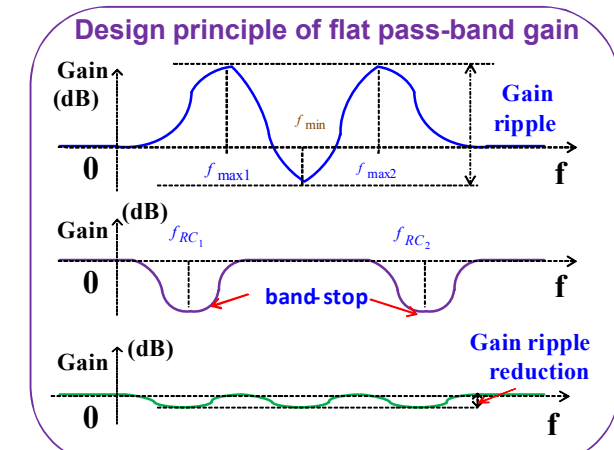
2. Research Background

- Defined concepts of positive and negative polyphase signals [1]
- Due to the transfer function of 4-stage passive RC poly-phase filter, pass-band gain ripples at two local maximum values [2]
- Proposed flat gain ripple technique with **two RC band-stop filters**

3. Proposed Design of Polyphase Filter



4. Simulation Results



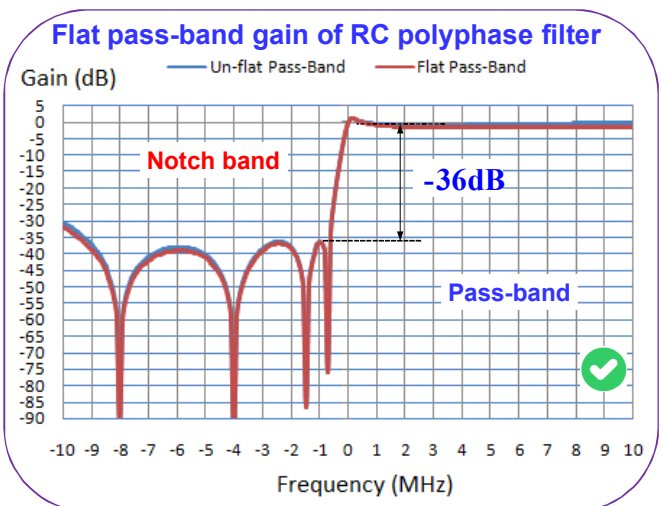
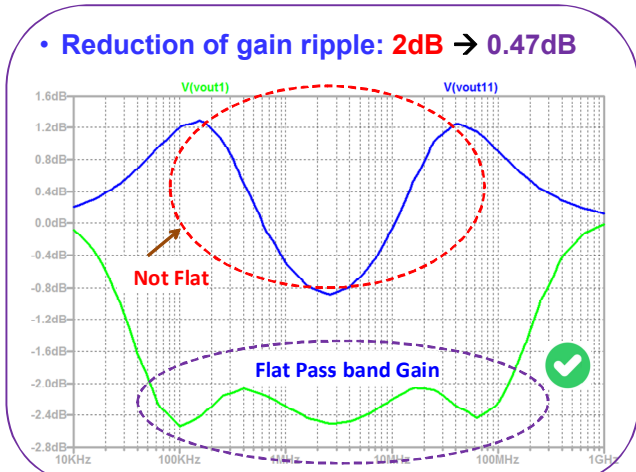
Conventional design

+

with two RC band-stop filters

↓

Flat pass-band gain



5. Conclusion

- Two RC band-stop filters are designed near two local maximum values to reduce the pass-band gain ripples.
- ✓ Pass-band gain ripple: 0.47dB
- ✓ Image rejection ratio: -36dB
- ✓ Bandwidth low-IF receiver: 8MHz

References

[1] Y. Tamura, R. Sekiyama, S. Sasaki, K. Asami, H. Kobayashi, "RC Polyphase Filter as Complex Analog Hilbert Filter", Means and Methods for Measurement and Monitoring, Supplement Book to Advanced Micro-Device Engineering VIII, Applied Mechanics and Materials, vol. 888, pp.26-36 (2019).

[2] M.T. Tran, N. Kushita, A. Kuwana, H. Kobayashi "Mathematical Analysis and Design of 4-Stage Passive RC Network in RF Front-End System" Proceedings of International Conference on Technology and Social Science 2019, (Kiryu, Japan) (May. 2019).