The full Brillouin gain calculation

$$\left(v_p\partial_z + \partial_t + v_p\alpha_p/2\right)\tilde{a}_p = -i\tilde{g}_0\tilde{a}_s\tilde{b}$$

$$\left(\pm v_s\partial_z + \partial_t + v_s\alpha_s/2\right)\tilde{a}_s = -i\tilde{g}_0^*\tilde{b}^*\tilde{a}_p$$

$$\left[v_m\partial_z + \partial_t + \left(i\Delta_m + \gamma_m/2\right)\right]\tilde{b} = -i\tilde{g}_0^*\tilde{a}_s^*\tilde{a}_p,$$

- Steady state: $\partial_t = 0$
- Lossy mechanical wave (large γ_m/v_m)

1. Wiederhecker, G. S., Dainese, P. & Alegre, T. P. M. Brillouin optomechanics in nanophotonic structures. APL Photonics 4, (2019).

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- Steady state: $\partial_t = 0$
- Lossy mechanical wave (large γ_m/v_m)

$$\partial_z P_p = -G_B P_p P_s - \alpha_p P_p$$

$$\partial_z P_s = \pm G_B P_p P_s \mp \alpha_s P_s$$

1. Wiederhecker, G. S., Dainese, P. & Alegre, T. P. M. Brillouin optomechanics in nanophotonic structures. APL Photonics 4, (2019).