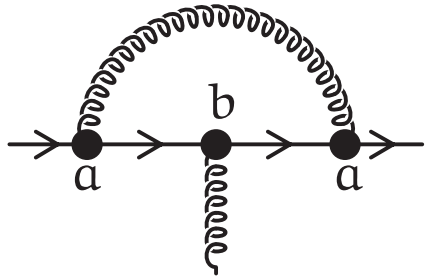
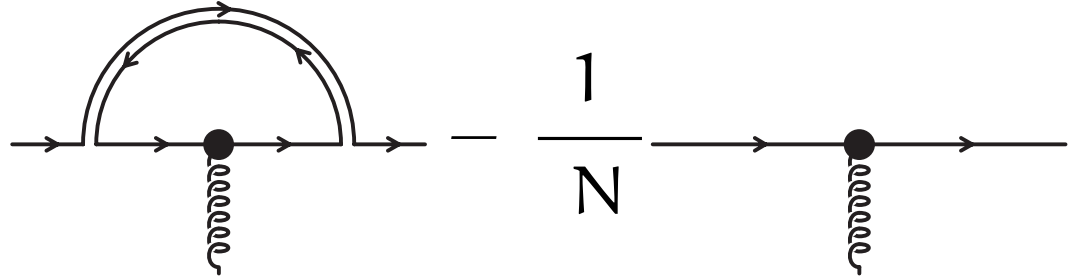
$$t_f^a t_f^b t_f^a =$$



$$=$$



$$= \quad \mathrm{tr}\,(t_f^b)\,\mathbf{1} - \frac{1}{N}\,t_f^b = -\frac{1}{N}\,t_f^b .$$