$$\mathrm{LEM}(X,Y) = \exp\left(\frac{\log X + \log Y}{2}\right),$$

$$A_0 = X \succ 0$$

$$H_0 = Y \succ 0$$

$$\begin{aligned} A_{t+1} &= \frac{A_t + H_t}{2} \\ H_{t+1} &= 2\,(A_t^{-1} + H_t^{-1})^{-1} \end{aligned}$$

$$\mathrm{AHM}(X,Y) = \lim_{t\to+\infty} A_t = \lim_{t\to+\infty} H_t = X^{\frac{1}{2}}\,(X^{-\frac{1}{2}}\,Y\,X^{-\frac{1}{2}})^{\frac{1}{2}}\,X^{\frac{1}{2}} = G(X,Y)$$

$$GX^{-1}G = Y$$

$$M = \frac{1}{2}M\#_p X + \frac{1}{2}M\#_p Y$$

$$m = \frac{1}{2}m^{1-p}x^p + \frac{1}{2}m^{1-p}y^p$$

$$m = \left(\frac{1}{2}x^p + \frac{1}{2}y^p\right)^{\frac{1}{p}} = M_p(x,y)$$

$$X\#_t Y = X^{\frac{1}{2}}\,\left(X^{-\frac{1}{2}}\,Y\,X^{-\frac{1}{2}}\right)^t\,X^{\frac{1}{2}},$$

$$\lim_{p\to 0} M_p(x,y) = G(x,y)$$

$$M = \frac{1}{2}M\#_p X + \frac{1}{2}M\#_p Y$$

$M(X,Y)$ is said operator monotone [?] if for $X' \preceq X$ and $Y' \preceq Y$, we have $M(X',Y') \preceq M(X,Y)$.