Order among Furuta type inequalities

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Abstract. The order between parametrized Furuta inequality and parametrized grand Furuta inequality is determined as follows: If $A \geq B > 0$ and $\delta \in [0,1]$, then

$$A^u \sharp_{\frac{\delta-u}{\beta-u}} (A^t \natural_{\frac{\beta-t}{p-t}} B^p) \leq A^u \sharp_{\frac{\delta-u}{p-u}} B^p \leq B^\delta$$

$$\leq A^\delta \leq B^u \sharp_{\frac{\delta-u}{p-u}} A^p \leq B^u \sharp_{\frac{\delta-u}{\beta-u}} (B^t \natural_{\frac{\beta-t}{p-t}} A^p)$$

for $t \in [0,1],\ 0 \leq t < p \leq \beta$ and $u \leq 0$.
More generally, if $\delta \in [0,p]$ under the above conditions, then

$$A^u \sharp_{\frac{\delta-u}{\beta-u}} (A^t \natural_{\frac{\beta-t}{p-t}} B^p) \leq A^u \sharp_{\frac{\delta-u}{p-u}} B^p \leq B^\delta$$

and

$$B^u \sharp_{\frac{\delta-u}{\beta-u}} (B^t \natural_{\frac{\beta-t}{p-t}} A^p) \geq B^u \sharp_{\frac{\delta-u}{p-u}} A^p \geq A^\delta.$$

The case of $\delta = 1$ gives the order between the Furuta inequality and grand Furuta inequality.

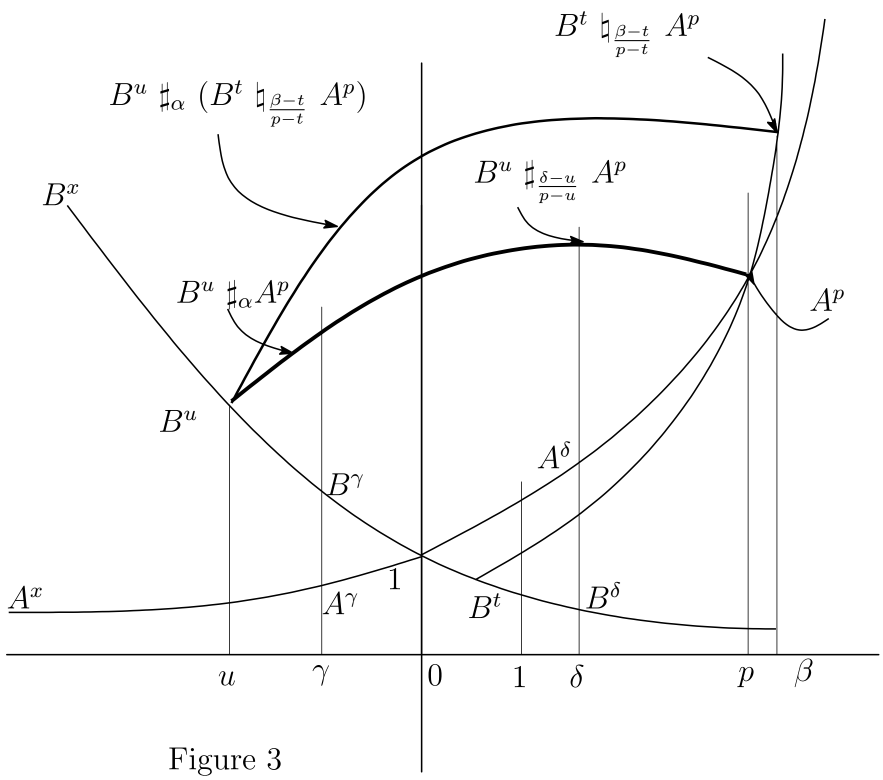

Figure 3