$f_1(u) = u^{\beta}, f_2(u) = exp(-\alpha u)$
$med(D) - a > 0,\ a < med(D) < b$

$Q_a = f_1(med(D) - a) f_2(med(D) - a)$
$Q_b = f_1(b - med(D)) f_2(b - med(D))$

Defining optimal bounds separately:

$\frac{\partial Q_a}{\partial a} = \frac{\partial}{\partial a}((med(D) - a)^{\beta}\ exp(-\alpha(med(D) - a))) =$
$=-\beta(med(D) - a)^{\beta-1} exp(-\alpha(med(D) - a)) + \alpha(med(D) - a)^{\beta} exp(-\alpha(med(D) - a))$
$\frac{\partial Q_a}{\partial a} = 0,\ \Rightarrow\ -\beta + \alpha(med(D) - a) = 0$
$a_{opt} = med(D) - \frac{\beta}{\alpha}$

$\frac{\partial Q_b}{\partial b} = \frac{\partial}{\partial b}((b - med(D))^{\beta}\ exp(-\alpha(b - med(D)))) =$
$= \beta(b - med(D))^{\beta-1} exp(-\alpha(b - med(D))) - \alpha(b - med(D))^{\beta} exp(-\alpha(b - med(D)))$
$\frac{\partial Q_b}{\partial b} = 0,\ \Rightarrow\ \beta - \alpha(b - med(D)) = 0$
$b_{opt} = med(D) + \frac{\beta}{\alpha}$