

Trabalho Computacional - Otimização Multiobjetivo

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Modelo

$$\min_{\mathbf{x}} \mathcal{L}(\mathbf{x}) = [M(\mathbf{x}), F(\mathbf{x})]^T$$

$$x_i = \{1, 2, 3\}$$

$$M(\mathbf{x}) = \sum_i^N x_i - 1$$

$$F(\mathbf{x}) = \sum_i^N p(x_i) f_i$$

$$p(x_i) = \frac{w(t_0 + k\Delta t) - w(t_0)}{1 - w(t_0)}$$

$$w(t) = 1 - \exp(-\frac{t^\beta}{\eta})$$

$$p(x_i; k) = \frac{w(t_0 + k\Delta t) - \textit{priori}}{1 - \textit{priori}}$$

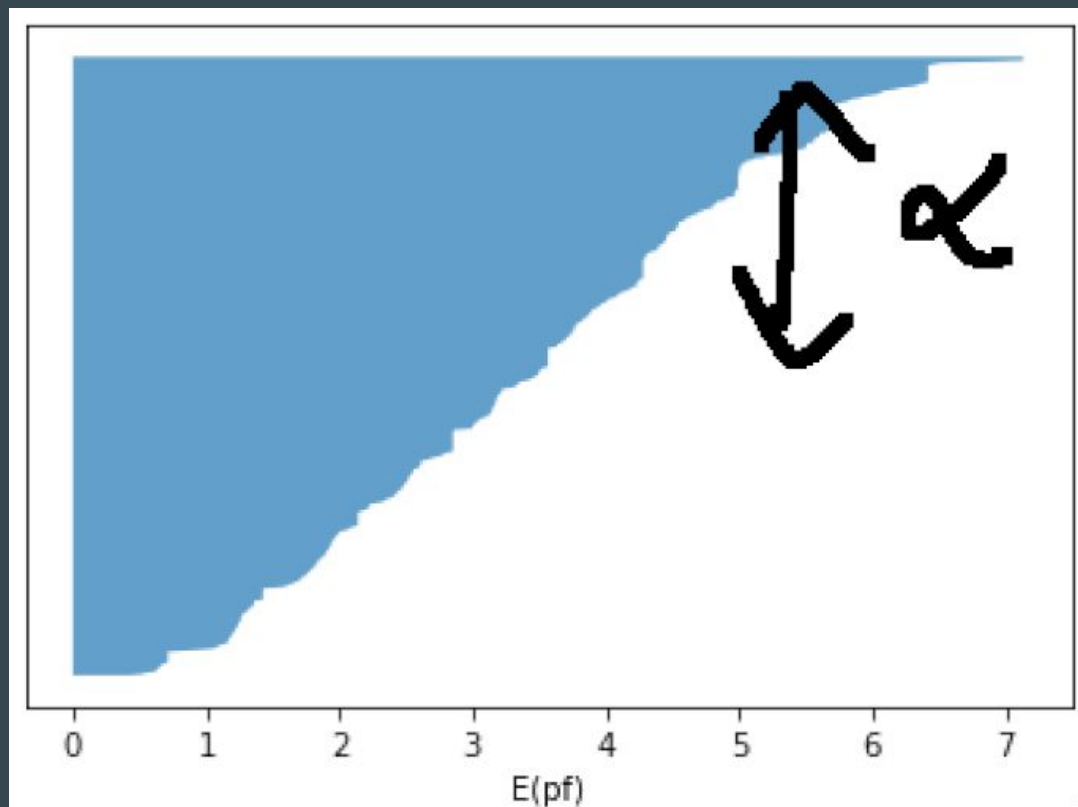
Heurística

Solução Intuitiva

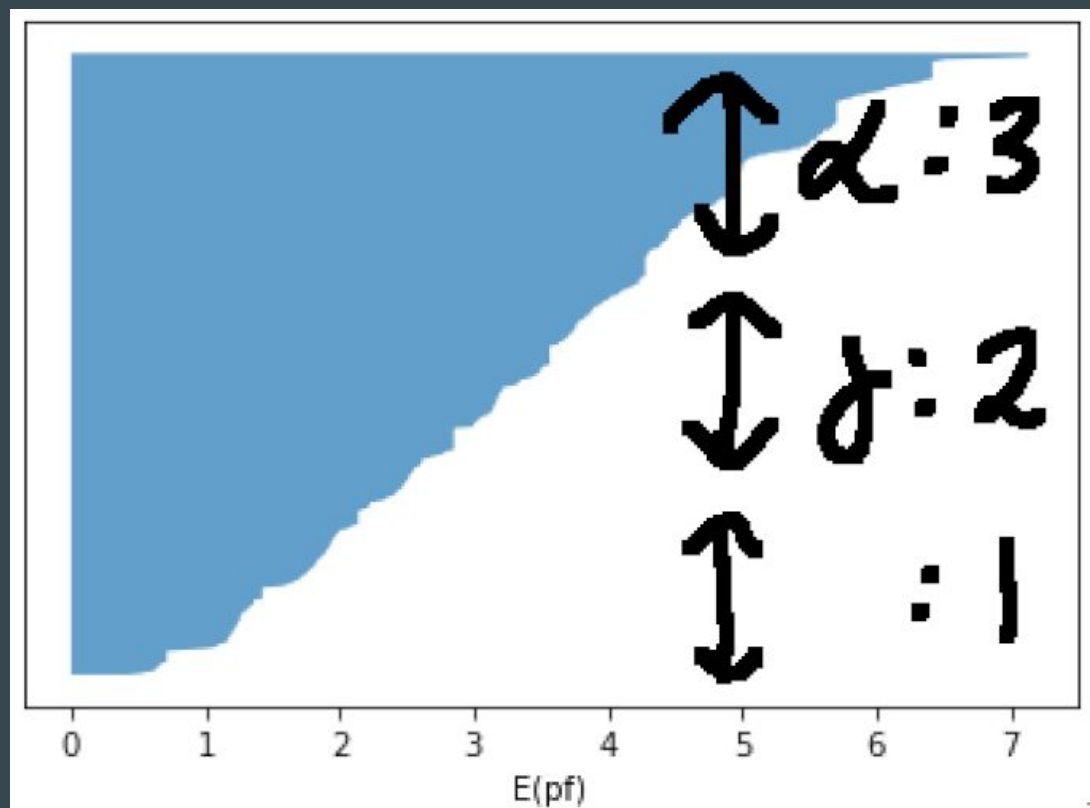
Aplique manutenção em equipamentos caros e antigos

- M e F são conflitantes e *monotônicas*
 - NP-Hard para polinomial, linear (*naive*) ou quadrático
 - Ordene pelo custo *priori* ou custo esperado de nenhuma manutenção
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Solução *Naive*



Solução Composta



$$\min_{\alpha, \gamma} \mathcal{L} = [M(\alpha, \gamma), F(\alpha, \gamma)]^T$$

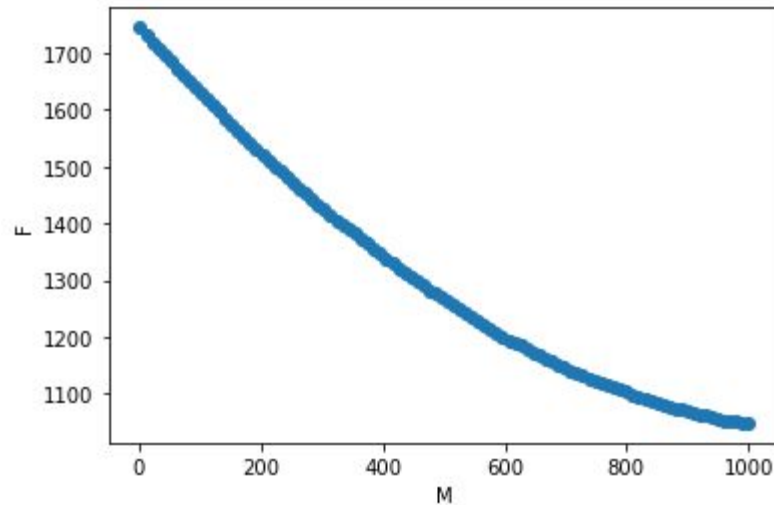
$$\alpha, \gamma \in [0, 1]$$

$$\alpha + \gamma \leq 1$$

Resultados

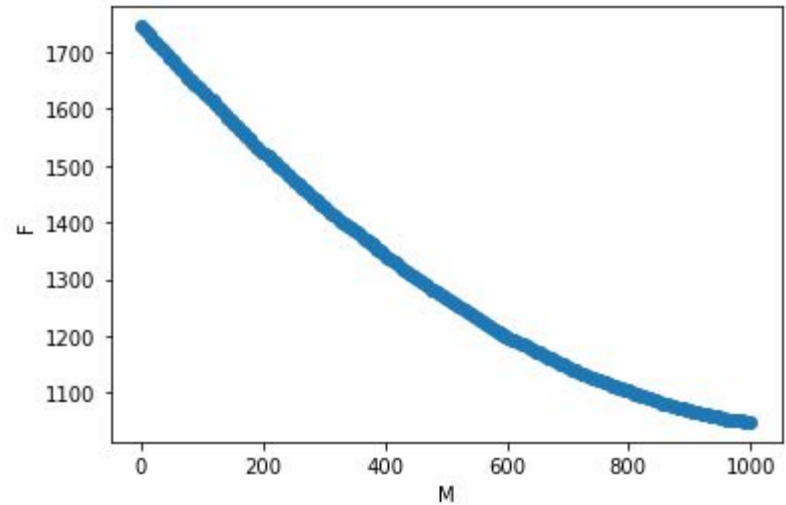
Solução *Naive*

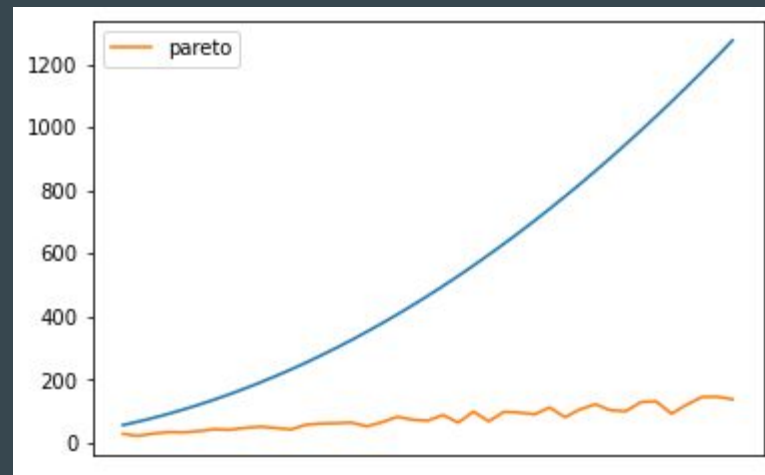
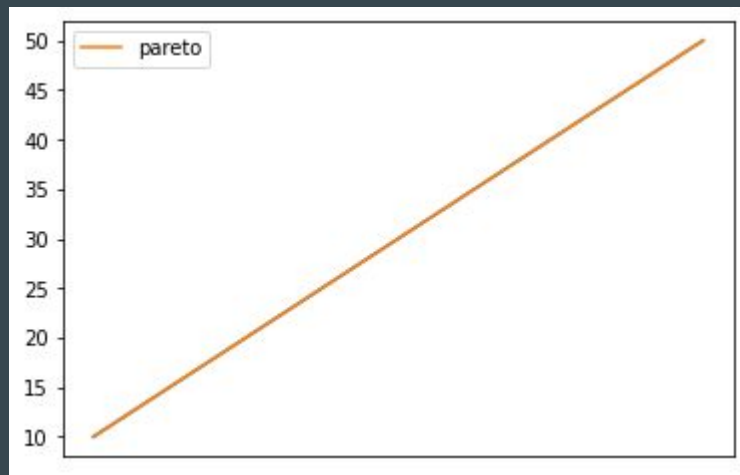
$\delta = 1e-2$
 $HV = 0.620407$
 $n = 100$



Solução Composta

$$\delta = 1e-2$$
$$HV = 0.622683$$
$$n = 208$$





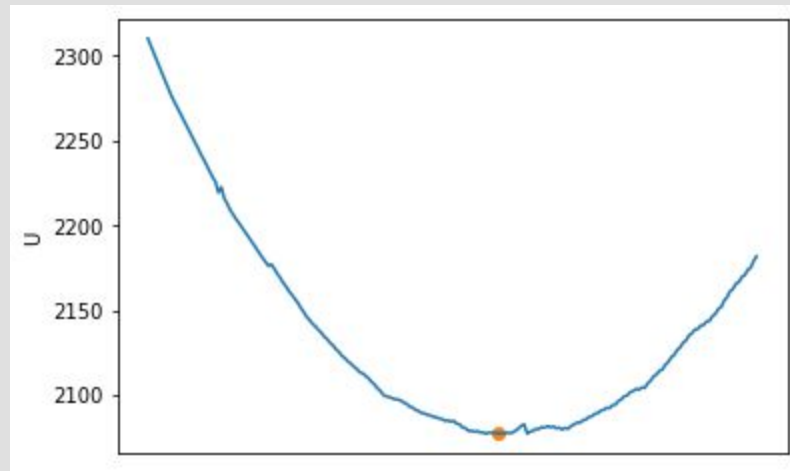
Tomada de Decisão

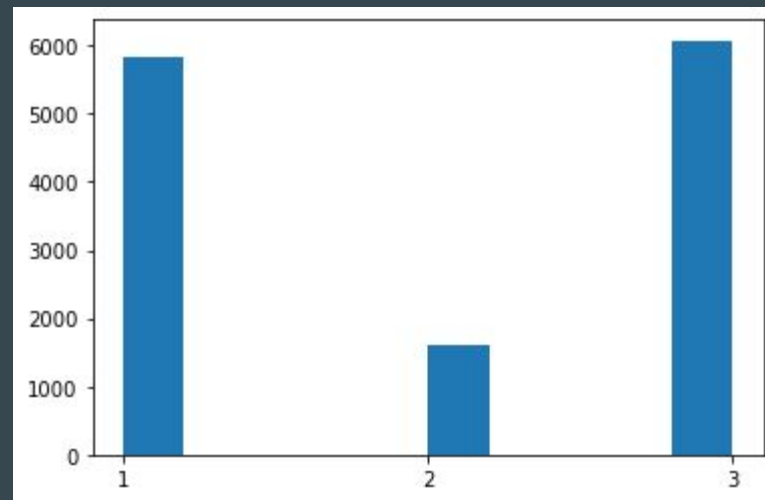
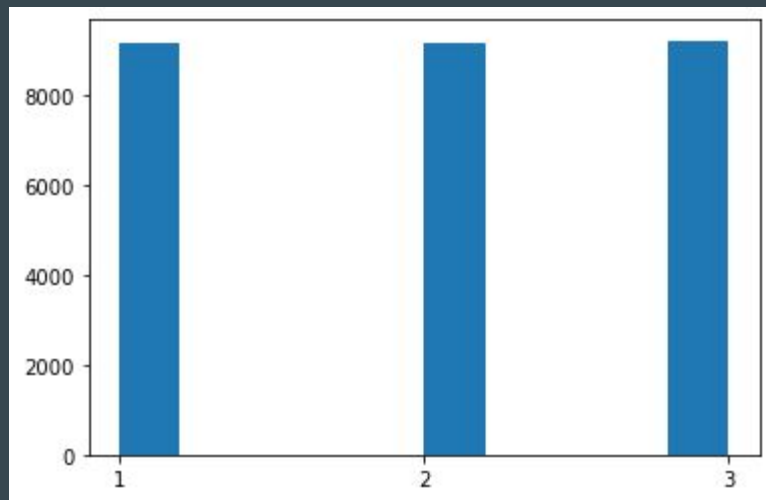
$$U(\mathbf{x}) = M(\mathbf{x}) + \tau F(\mathbf{x})$$

$$\tau = 1.25$$

$$\alpha = 0.574$$

$$\gamma = 0$$





Obrigado