Unification of reduced-space and full-space methods for large-scale design optimization

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Outline

Existing Architectures

- Reduced space method
- Full space method

Hybrid

- Example

Code

- Example

Existing Architectures

Feel free to contact me if you have any suggestions!

1. Simple
2. Clean
3. Oxford University Colours

Enjoy! ☺

Full space method

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Hybrid

Let $p(x) = \mathcal{N}(\mu_1,\, {\sigma^2}_1)$ and $q(x) = \mathcal{N}(\mu_2,\, {\sigma^2}_2)$:

$$\mathcal{N} = \frac{1}{\sigma\,\sqrt{2\,\pi}}\,\mathrm{e}^{-\frac{(x-\mu)^2}{2\,\sigma^2}} \tag{1}$$

Kullback-Leibler divergence for continuous probabilities:

$$\begin{aligned} D(p,q) &= \int p(x) \log \frac{p(x)}{q(x)} \mathrm{d}x \\ &= \int p(x)\ \ln p(x) \mathrm{d}x - \int p(x)\ \ln q(x) \mathrm{d}x \\ &= \frac{1}{2} \ln\left(2\,\pi\,\sigma_2^2\right) + \frac{\sigma_1^2 + (\mu_1 - \mu_2)^2}{2\,\sigma_2^2} - \frac{1}{2}\left(1 + \ln 2\,\pi\,\sigma_1^2\right) \\ &= \ln \frac{\sigma_2}{\sigma_1} + \frac{\sigma_1^2 + (\mu_1 - \mu_2)^2}{2\,\sigma_2^2} - \frac{1}{2} \end{aligned}$$

Code

Greatest Common Divisor

```python
def greatest_c_remainder(a,b):
        '''Greatest common divisor of a and b'''
        r = a % b
        if r == 0:
                return b
        else:
                m = b
                n = r
        return greatest_c_remainder(m,n)
```