

# Natural Exponential Families and Approximation Operators

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## Abstract

An exponential operator  $S_\lambda(f, t)$  has the form  $\int_{\mathbb{R}} W_\lambda(x, t) f(x) dx$  where  $f$  is a continuous function with compact support. It is assumed that

$$\partial_t \int_{\mathbb{R}} W_\lambda(x, t) f(x) dx = \int_{\mathbb{R}} W_\lambda(x, t) \frac{u-t}{p(t)} f(x) dx,$$

and mild assumptions on  $p$ . It turns out that  $t$  is the first moment. This concept was introduced in the 1970's and rediscovered in a statistical context in the 1980's. We summarize the developments in this area and mention some open problems.