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The most popular method for the solution of ill-posed problems is Tikhonov regularization method for which the priori has the form of a smoothing operator of;

$$S(x) = \int_{t_o}^{t_f} \left( \frac{d^k x}{dt^k} \right)^2 dt$$

with the corresponding normal equation of;

$$K^T Kx + \lambda S'(x) = K^T d$$

We first use a varying smoothing operator in the form of;

$$S_{ext}(x) = \int_{t_o}^{t_f} \sum_{k=0}^p E_k(t) \left( \frac{d^k x}{dt^k} \right)^2 dt$$

We then discuss the formulation and the solution of this scheme in the finite dimensional space. (Received August 30, 2006)