

## **Image reconstruction using the fictitious time integration method (FTIM)**

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### **Summary**

In this study, we adopt the fictitious time integration method to treat the image reconstruction problem. The distorted image is considered as a result of diffused data from the initial perfect image by using a nonlinear diffusion equation. The image reconstruction problem then becomes an inverse problem by using the data in the final time to recover the data in the initial time. This inverse problem is known as the backward in time nonlinear diffusion problem which is highly ill-posed. We propose to use the fictitious time integration method to tackle this highly ill-posed image reconstruction problem and it is found that the proposed method can obtain very accurate results and even has good noise resistance. Five numerical examples are provided to show the validity of the current approach and they all show the present method is appropriate to deal with the image reconstruction problem.

