ILL-POSEDNESS OF COMPACT OPERATOR EQUATIONS

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Abstract. Consider the problem of solving the operator equation

$$Tx = y, \qquad (*)$$

where : $T : X \to Y$ is a linear operator between normed linear spaces X and Y. The following are results from ementary operator theory:

(1) If X is infinite dimensional and T is a compact linear operator, then T does not have a continuous inverse from its range $R(T)$.
(2) If X and Y are Banach spaces and T is a bounded linear operator with $R(T)$ not closed, then T does not have a continuous inverse.

Thus, in the above cases, the the problem of soving $(*)$ is *ill-posed*.

In this talk, we shall describe issues related to ill-posedness when X and Y are Hilbert spaces, and also discuss Tikhonov regularization of such equations and the related error estimtes.

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