Marje Johanson (johanson@ut.ee), Departement of Mathematics and Computer Sciences, Tartu University, 50409 Tartu, Estonia , ***$M\,(r,s)$-ideals of compact operators.***

ABSTRACT. The subspace $\mathcal{K}(X,Y)$ of compact operators from a Banach space X to a Banach space Y is called an *ideal* in the Banach space $\mathcal{L}(X,Y)$ of all bounded linear operators if there exists a norm one projection P on $\mathcal{L}(X,Y)^*$ with $\ker P = \mathcal{K}(X,Y)^{\perp}$. Moreover, if there are $r,s \in (0,1]$ so that $\|f\| \geq r\|Pf\| + s\|f - Pf\|$ for all $f \in \mathcal{L}(X,Y)^*$, then we say that $\mathcal{K}(X,Y)$ is an $M(r,s)$-*ideal* in $\mathcal{L}(X,Y)$.

Well-studied M-ideals are precisely $M(1,1)$-ideals. However the main technique for M-ideals involving the 3-ball property does not work in the more general case. Using methods of M-ideals and relaying on results E. Oja it is possible to prove

Theorem [R. Haller, M. Johanson, E. Oja]. Let X and Y be Banach spaces. Assume that $\mathcal{K}(X,X)$ is an $M(r_1,s_1)$-ideal in $\mathcal{L}(X,X)$ with $r_1 + s_1/2 > 1$ and $\mathcal{K}(Y,Y)$ is an $M(r_2,s_2)$-ideal in $\mathcal{L}(Y,Y)$ with $r_2 + s_2/2 > 1$. Then $\mathcal{K}(X,Y)$ is an $M(r_1^2 r_2, s_1^2 s_2)$- and an $M(r_1 r_2^2, s_1 s_2^2)$-ideal in $\mathcal{L}(X,Y)$.

By changing the proving methods and basing on the result that $M(r,s)$-ideals are separably determined the following improvement is valid.

Theorem. Let X and Y be Banach spaces. Assume that $\mathcal{K}(X,X)$ is an $M(r_1,s_1)$-ideal in $\mathcal{L}(X,X)$ with $r_1 + s_1/2 > 1$ and $\mathcal{K}(Y,Y)$ is an $M(r_2,s_2)$-ideal in $\mathcal{L}(Y,Y)$ with $r_2 + s_2/2 > 1$. Then $\mathcal{K}(X,Y)$ is an $M(r_1 r_2, s_1 s_2)$-ideal in $\mathcal{L}(X,Y)$.

This talk is based on a joint work with Rainis Haller and Eve Oja.