Title of Project: Trace Formulae and Multivariable Operator Theory

Funding agency: Science and Engineering Research Board, DST, Govt of India

Project Investigator: Dr. Arup Chattopadhyay (Department of Mathematics)

Objective: One of the most intriguing and important problems in operator theory and function theory is the existence of a finite generating set for a commuting tuple of operators. Alternatively, one may ask when the rank of a commuting tuple of operators is finite. Computation of ranks of shift invariant as well as shift co-invariant subspaces beyond the case of the one variable Hardy space is an excruciatingly difficult problem, even if one considers only shift invariant (as well as co-invariant) subspaces of the Hardy space over the unit polydisc. One of the main aim of this project is to compute the rank of a tractable class of shift invariant subspaces of some reproducing kernel Hilbert spaces.

- Achievements: The following three articles have been published recently under this project in some reputed international Mathematics journals

- 1. *Multiplicities, invariant subspaces and an additive formula*; **Chattopadhyay, Arup**; Sarkar, Jaydeb; Sarkar, Srijan; **Proc. Edinb. Math. Soc.** (2); 2021.

- 2. *Kernels of perturbed Toeplitz operators in vector-valued Hardy spaces*; **Chattopadhyay, Arup**; Das, Soma; Pradhan, Chandan; **Adv. Oper. Theory**; 2021.

- 3. *Almost invariant subspaces of the shift operator on vector-valued Hardy spaces*. **Chattopadhyay, Arup**; Das, Soma; Pradhan, Chandan; **Integral Equations Operator Theory**; 2020.