

**Meeting:** 1006, Lubbock, Texas, SS 11A, Special Session on Future Directions in Mathematical Systems and Control Theory

1006-93-45            **Viswanath Ramakrishna\*** ([vish@utdallas.edu](mailto:vish@utdallas.edu)), Mathematical Sciences, Univ of TX at Dallas, Richardson, TX 75083, and **Hong Zhou**. *Explicit Formulae for Several Two Qubit Evolutions*.

Quantum information and control require the control of two qubit systems with selectivity. Various universality results ensure that this ability suffices to generate any quantum logic gate. Many extant results in the literature are unable to guarantee selectivity. Thus, for instance, these results assume it is possible to neglect the coupling between two qubits when generating a single qubit evolution, while assuming its munificent presence when a desired two qubit evolution is required. In our opinion a major first step for such results is the ability to compute two qubit exponentials in closed form. In this work we provide several such explicit formulae. These formulae do not require any eigenvector-eigenvalue calculations. Instead they rely on the ability to find the minimal polynomials of matrices in the Lie algebra of skew-Hermitian matrices of size four directly. (Received January 25, 2005)