LAST TIME:

- Introduction to continuous time processes;
- “Little –o” notation;
- The exponential distribution and its properties;
- Holding time in a state for continuous time processes;
- The embedded jump chain of a continuous time process.

THIS TIME:

- Rates of a continuous time Markov chain;
- More on the embedded jump chain;
- Examples.

ICA information

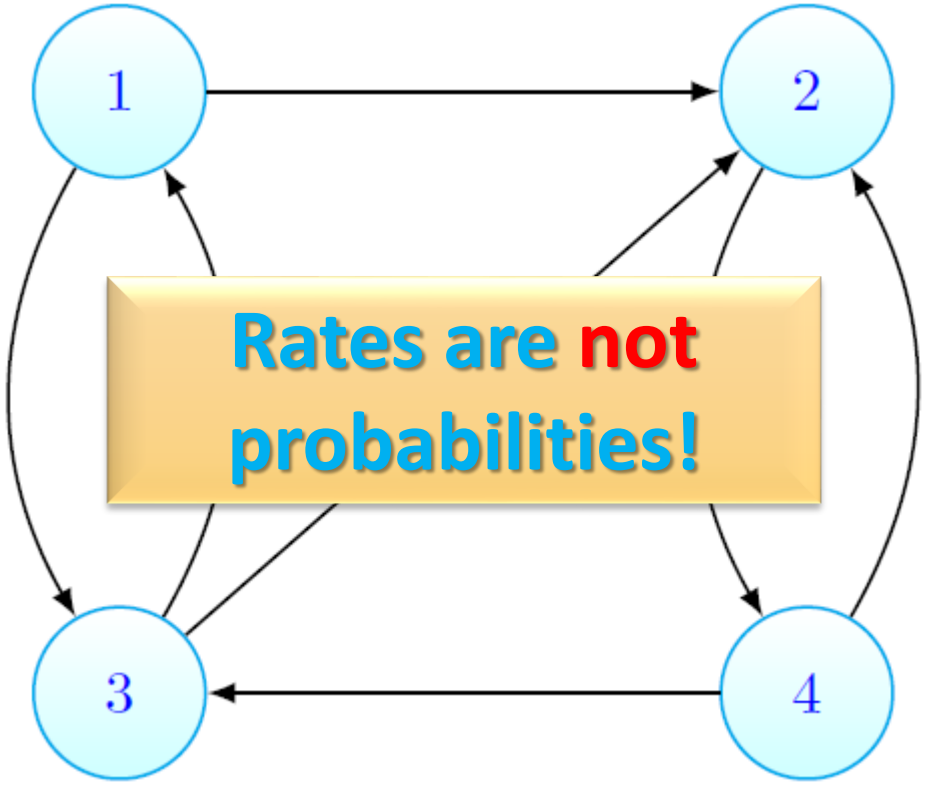
Three short questions on DISCRETE time Markov chains only.

The third question will list a number of statements, and you will need to pick out which are TRUE statements. Marks will be awarded for each true statement you pick. Marks will be deducted if you choose a statement that is actually false. This is to prevent you from choosing all the statements to get full marks!

The ICA is open book – you may bring any paper based materials you wish including lecture notes and slides, hand written notes, solutions to past questions.

Additional office hours have been arranged – see Moodle.

IF YOU REQUIRE EXTRA TIME, AND HAVE NOT LET RUSSELL KNOW, YOU MUST DO SO NOW!



STATE	How long does the process stay in this state?	To which states can we go to next?	At what rate?	Time until we go to this state (conditional on going there)?
1	$T(1) \sim \exp(q_1)$	2 3	q_{12} q_{13}	T_{12}~exponential(q_{12}) T_{13}~exponential(q_{13})
2	$T(2) \sim \exp(q_2)$	4	q_{24}	T_{24}~exponential(q_{24})
3	$T(3) \sim \exp(q_3)$	1 2	q_{31} q_{32}	T_{31}~exponential(q_{31}) T_{32}~exponential(q_{32})
4	$T(4) \sim \exp(q_4)$	3 2	q_{43} q_{42}	T_{43}~exponential(q_{43}) T_{42}~exponential(q_{42})

If we are in state 1 currently:
$T(1)=\min\{T_{12}, T_{13}\}$

How is q_1 related to q_{12} and q_{13}?

If we are in state 2 currently:
$T(2)=T_{24}$

How is q_2 related to q_{24}?

If we are in state 3 currently:
$T(3)=\min\{T_{31}, T_{32}\}$

How is q_3 related to q_{31} and q_{32}?

If we are in state 4 currently:
$T(4)=\min\{T_{42}, T_{43}\}$

How is q_4 related to q_{42} and q_{43}?