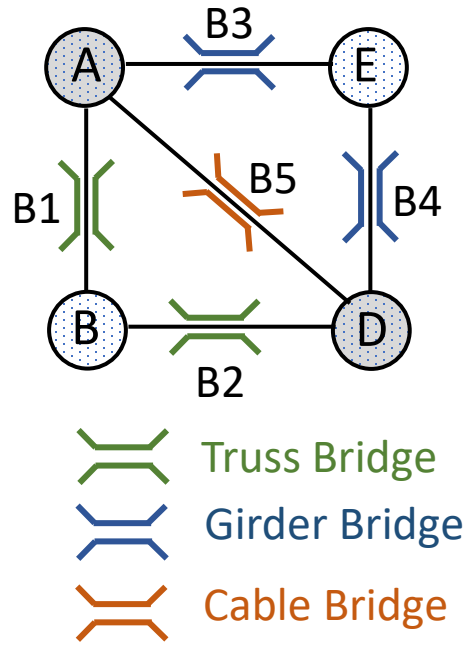
Problem Description

What is the disconnection probability of *city A* to *city D*?



The limit state function for each bridge: $G(\mathbf{X}) = R_i - AS_i$ for $i = 1, \ldots, 5$ where R_i is the capacity of the bridge, A is the peak ground acceleration and S_i is the site effect factor. The limit state function can be rewritten as $Z_i = \ln R_i - \ln A - \ln S_i$. The system event is then defined as a link-set system: $(E_{B1} \cup E_{B2}) \cap (E_{B3} \cup E_{B4}) \cap E_{B5}$

The problem is solved using (a) Matrix-based system reliability method and (b) sequential compounding method.

Variable Definition	Distribution type	Mean	c. o. v.	Correlation between pairs of capacities of similar bridge
Peak ground acceleration, (A)	Lognormal	0.15	0.5	-
Site effect factor, (S_i)	Lognormal	1.0	0.2	-
Capacities of B1, B2, (R_1, R_2)	Lognormal	0.4	0.3	0.3
Capacities of B3, B4, (R_3, R_4)	Lognormal	0.5	0.5	0.5
Capacity of B5, (R_5)	Lognormal	0.3	0.3	-