MATLAB REPORT

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Problem 2: Stochastic Stability of Infinite slopes

Theory: The Monte Carlo Method is a computational algorithm that relies on repeated random sampling to address risk and uncertainty in quantitative analysis and decision making.

During a Monte Carlo simulation, values are sampled at random from the input probability distributions. Each set of samples and the resulting outcome from that sample are recorded.

PROBLEM:

H = depth of soil above bedrock

h = height of groundwater table above bedrock,

Υ = moist unit weight

Υ_{sat} = saturated unit weight of the soil

Υ_w = unit weight of water (9.81 kN/m^3)

Φ = effective stress friction angle

Θ = slope inclination.

Variable	Description	Distribution	Statistics
H	Depth of soil above bedrock	Uniform	[2,8] m
h = H*U	Height of water table	U is uniform	[0,1]
φ	Effective stress friction angle	Lognormal	Mean = 35° cov = 8%
Θ	Slope inclination	Lognormal	Mean = 20° cov = 5%
Υ	Moist unit weight of soil	*	*
Υ_{sat}	Saturated unit weight of soil	**	**
Υ_w	Unit weight of water	Deterministic	9.81 kN/m^3

*$\Upsilon = \Upsilon_w$ (G_s + 0.2e)/ (1+e) (assume degree of saturation = 20% for "moist").

**$\Upsilon_{sat} = \Upsilon_w(G_s + e)/ (1+ e)$ (degree of saturation = 100%)

Assume specific gravity of solids = G_s = uniformly distributed [2.5, 2.7] and void ratio = e = uniformly distributed [0.3, .6]

COMMAND WINDOW: