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Let $G = (V, E)$ be a finite graph and H be a subgraph of G . We know from [Das04] that the eigenvalues of L_G and L_H are interwoven. That is

$$\lambda_1(G) \geq \lambda_1(H) \geq \lambda_2(G) \geq \lambda_2(H) \geq \dots \geq \lambda_n(G) = \lambda_n(H) = 0.$$

An example of a quotient space in topology is $[0, 1]/\{0, 1\} \sim S^1$. Pictorially

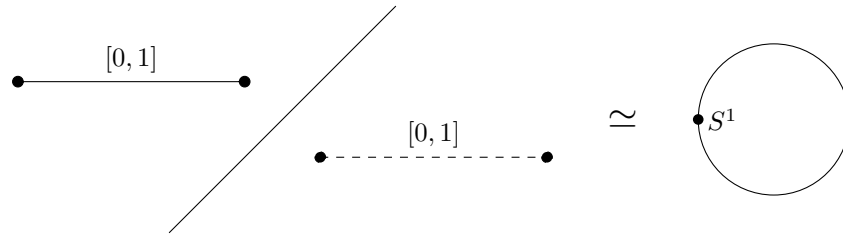


Figure 1: Quotient Space of $[0, 1]/\{0, 1\}$

The following truth table establishes logical equivalency between an implication and its contrapositive.

P	Q	$P \implies Q$	$\neg Q$	$\neg P$	$\neg Q \implies \neg P$
T	T	T	F	F	T
T	F	F	T	F	F
F	T	T	F	T	T
F	F	T	T	T	T

References

- [Das04] K.Ch. Das. The laplacian spectrum of a graph. *Computers & Mathematics with Applications*, 48(5):715–724, 2004.