

Optimal value of continuous relaxation: 2.15863

Optimal value of integer problem: 2.19787

The optimal portfolio is obtained by investing in 20 of the risky assets and in the riskless asset.

Optimal solution:

w [\*] :=

ADSK	4.4083e-09	DDS	4.39555e-09	LNT	4.41531e-09	PKS	4.40643e-09
ASBC	0.003871	DUK	0.075453	LOW	4.41276e-09	PMTC	4.40659e-09
BBV	0.00625	EIX	4.41219e-09	LRCX	4.4734e-09	R	4.40584e-09
BOW	4.41942e-09	ETR	0.02076	LZ	4.41822e-09	RSH	4.39884e-09
BXS	0.02973	FISV	0.009298	MIK	0.023166	SAFC	4.40411e-09
CAJ	0.007312	FNF	0.025011	MMM	0.02444	SKS	0.004221
CCU	0.113211	FRE	0.01299	MWV	4.41289e-09	VZ	4.41057e-09
CI	0.028887	GENZ	4.42004e-09	NDE	0.02016	WPO	4.41213e-09
CIN	0.01014	GPC	4.41624e-09	NFG	0.03675	XRAY	0.042012
CTAS	4.40019e-09	HP	4.41152e-09	NTRS	0.012056	XRX	4.39557e-09
CTL	4.40029e-09	IR	4.41203e-09	NYT	4.40669e-09		
CVC	4.40403e-09	KBH	4.39552e-09	ODP	4.40777e-09		
DAL	4.39524e-09	KLAC	0.006586	OKE	4.41638e-09		

w0 = 0.487696

gamma [\*] :=

ADSK	0	CI	3	DUK	21	GPC	0	LRCX	0	NTRS	2	RSH	0
ASBC	1	CIN	3	EIX	0	HP	0	LZ	0	NYT	0	SAFC	0
BBV	5	CTAS	0	ETR	5	IR	0	MIK	6	ODP	0	SKS	3
BOW	0	CTL	0	FISV	2	KBH	0	MMM	2	OKE	0	VZ	0
BXS	15	CVC	0	FNF	9	KLAC	1	MWV	0	PKS	0	WPO	0
CAJ	2	DAL	0	FRE	2	LNT	0	NDE	8	PMTC	0	XRAY	12
CCU	21	DDS	0	GENZ	0	LOW	0	NFG	15	R	0	XRX	0

BONMIN (2007): Branch-and-Bound Algorithm with Most Fractional (Default Settings) branching rule:

Optimal solution obtained  
Time: 455.32 CPU sec  
Number of nodes: 6888

BONMIN (2007): Branch-and-Bound Algorithm with Idiosyncratic Risk branching rule:

Optimal solution obtained  
Time: 1227.34 CPU sec  
Number of nodes: 13576

BONMIN (2007): Branch-and-Bound Algorithm with Portfolio Risk branching rule:

Optimal solution obtained  
Time: 70.38 CPU sec  
Number of nodes: 1202

CPLEX 10.1: Default Settings:

Optimal solution obtained  
Time: 483.98 CPU sec  
Number of nodes: 9517

MINLP\_BB (2007): Default Settings:

Optimal solution obtained  
Time: 101.42 CPU sec  
Number of nodes: 5154